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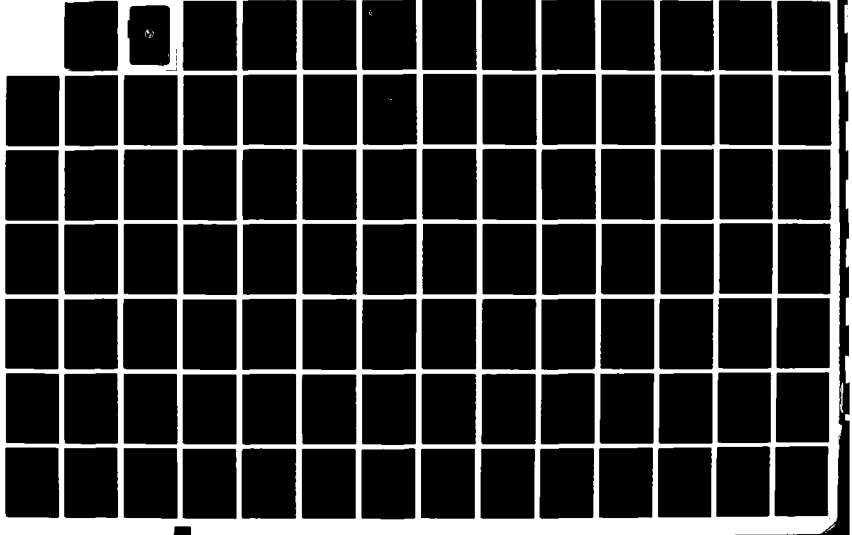

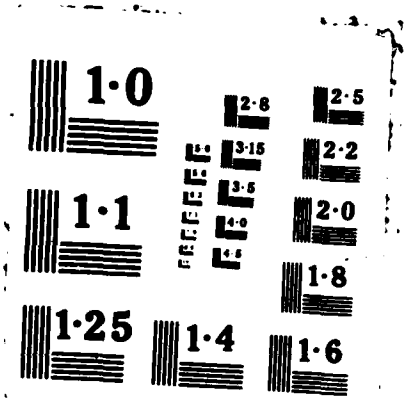
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TECHNICAL PAPER
CAA-TP-87-5

TRANSPORTATION IMPROVEMENT PROGRAM REQUIREMENTS (TRIPR): CONCEPT PAPER OF THE STRATEGIC MOBILITY MODULE

MARCH 1987

PREPARED BY
STRATEGY AND PLANS DIRECTORATE
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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

ODCSLOG has contracted with General Research Corporation for development of a Logistics Decision Support System (LOG DSS). Included in the LOG DSS is a Strategic Mobility Module (SMM) to provide readily available information for timely decisionmaking concerning strategic mobility options based upon Defense Guidance Scenario, subsystems of the transportation system and all pipelines for all units, items and personnel shipped. This study developed a concept paper for the SMM defining the initial functional design concept and developing a prototype of the SMM.

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TRANSPORTATION IMPROVEMENT PROGRAM REQUIREMENTS (TRIPR): CONCEPT PAPER OF THE STRATEGIC MOBILITY MODULE

March 1987

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DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF:

CSCA-SPM

09 APR 1987

SUBJECT: Transportation Improvement Program - Requirements (Concept Paper)

Headquarters, Department of the Army
Deputy Chief of Staff for Logistics
ATTN: DALO-TSM
Washington, DC 20310-0562

1. References:

a. Letter, DACS-DMO, 19 October 1983, subject: Responsibilities of Study Performing and Study Sponsoring Organization.

b. Draft Study Directive DALO-TSM, undated, subject: Transportation Improvement Program 3 (TRIP3) Army Strategic Mobility System Assessment (ASMSA).

2. The Deputy Chief of Staff for Logistics (DCSLOG) requested that the US Army Concepts Analysis Agency (CAA) develop a Concept Paper for design and development of the Logistics Decision Support System, Strategic Mobility Module. The enclosed report responds to that request.

3. The report defines system requirements for the Strategic Mobility Division action officers to determine impacts of strategic mobility issues, lift requirements and closure capability "what if" analysis. It also includes a prototype of the Strategic Mobility Module, which provides a functional representation of the system input, output and information panels.

E. B. VANDIVER III
Director

CAA	**TRANSPORTATION IMPROVEMENT PROGRAM REQUIREMENTS (TRIPR): CONCEPT PAPER OF THE STRATEGIC MOBILITY MODULE**	**STUDY SUMMARY CAA-TP-87-5**

THE REASON FOR PERFORMING THE STUDY was to assist Headquarters, Department of the Army (HQDA) in developing a concept paper for the Strategic Mobility Module, Logistics Decision Support System (LOG DSS).

THE PRINCIPAL FINDINGS are that the system operational design requires:

(1) A Data Base Management System to access data bases and systems of the LOG DSS and the Headquarters, Department of the Army Decision Support System (HQDA DSS).

(2) A Model Base Management System for simulating intertheater, intratheater, and continental United States (CONUS) transportation movement.

(3) A System Management to provide for housekeeping functions and interface with other LOG DSS and HQDA DSS modules.

(4) Menu-driven screens to accomplish model operation. Program Objective Memorandum (POM) Budget Analysis Management Infrastructure System functions and interface with other LOG DSS modules.

(5) A decision tool to help rank order program increments as part of the Model Base Management System.

THE MAIN ASSUMPTION is that identified transportation PC-based models will be available.

THE PRINCIPAL CONSTRAINTS are (1) Office of the Deputy Chief of Staff for Logistics, Strategic Mobility Division (ODCSLOG TSM) action officers will not be able to access all the data bases until their workstations are converted to operate in a classified mode; and (2) implementation of the Strategic Mobility Module must conform to the specifications established for HQDA DSS.

THE SCOPE OF THE STUDY is directed toward determining the initial functional design concept for the Strategic Mobility Module, Logistics Decision Support System, and developing a prototype of the module. The system is required to:

(1) Permit sensitivity analysis of all aspects of the transportation system needed to mobilize, deploy, and sustain Army forces worldwide.

(2) Indentify transportation system constraints and limitations in ways that directly lead to recommended changes in transportation procedures and funding. The process must analyze the transportation system capabilities and prioritize resources.

THE STUDY OBJECTIVES are (1) develop a concept paper describing the initial functional design concept, and (2) develop a prototype of the system.

THE BASIC APPROACH was to conduct research and collect data. This resulted in the development of the initial functional design concept. The design concept was revised several times based on iterative reviews by DALO-TSM. Working closely with the action officers in DALO-TSM, a functional representation of the required capability (prototype) was developed in order to define and refine user requirements.

THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics, HQDA, who established the objectives and monitored study activities.

THE STUDY EFFORT was directed by LTC Robert H. Fahringer, Strategy, Concepts and Plans Directorate.

COMMENTS AND QUESTIONS may be sent to Director, US Army Concepts Analysis Agency, ATTN: CSCA-SP, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

Tear-out copies of this synopsis are at back cover.

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CHAPTER 1

INTRODUCTION

1-1. BACKGROUND

a. The purpose of this paper is to describe the initial design concept of the LOG DSS Strategic Mobility Module (SMM). The SMM will be a portion of the ODCSLOG Decision Support System.

b. The Strategic Mobility Division of ODCSLOG (DALO-TSM) exercises General Staff supervision over strategic mobility aspects of war and contingency plans, transportation concepts, doctrine and force structure, mobilization and deployment exercises, control of strategic transportation resources, intermodalism, Army standard transportation ADP systems, and transportation assets (i.e., rail, watercraft, and containers).

c. In accomplishing these missions, the Strategic Mobility Division must process a significant amount of input from the Army Staff for planning the strategic mobility requirements of the Army. Similarly, the Strategic Mobility Division of DCSLOG (DALO-TSM) receives a significant amount of input from the ARSTAF to process information concerning programing/budgeting requirements for the transportation system. Currently, action officers do not have direct access to automated data bases or transportation models that could assist in rapidly defining strategic mobility requirements, capabilities and shortfalls. The present system requires action officers to manually screen technical manuals and computer printouts to perform very notionalized, nonautomated, general calculations or to rely on other agencies such as J-4, OSD, or CAA model and analyses to determine what is needed to support the Army force requirements and the transportation system's capability to support that requirement. The latter option is sufficient for long lead time studies but is not responsive to short suspense analysis requirements and "what-if" drills. Additionally, TSM cannot assess the specific impact of funding increases or decreases on the ability to "close the force," nor is it able to make decisions concerning resource reallocation to attempt to "optimize" the output (performance) of the total mobility system. The current method of operation limits the action officer and the ARSTAF in its ability to conduct thoughtful and timely analysis needed for decisions impacting upon the strategic mobility system as a whole.

1-2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS. This paragraph presents the functional and operational requirements of the SMM from the standpoint of capabilities that the module will provide to users.

a. In order to accomplish the specific performance requirements that will be discussed in this concept paper, the SMM must be capable of performing three basic functions: Model Base Management, Data Base Management, and an interface among the model base, data base, and environment software. An overview of these functions is shown at Figure 1-1.

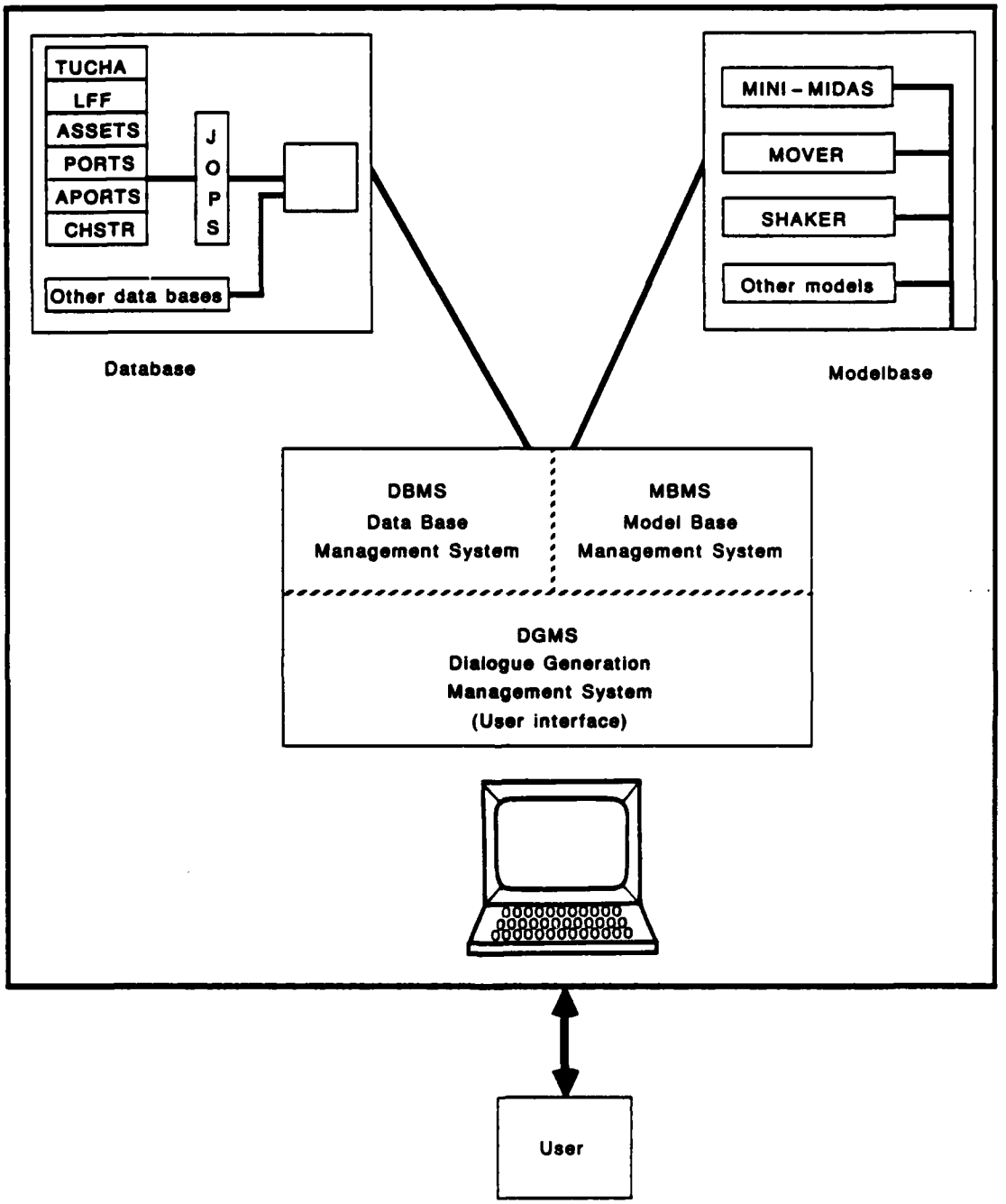


Figure 1-1. Strategic Mobility Module Components of the Decision Support System

(1) **Model Base Management System (MBMS).** The system must contain an appropriate set of models capable of simulating intertheater, intratheater, and CONUS transportation, as well as a multiattribute decision utility. The candidate transportation models specified in Appendix E are a beginning of such a model library. The MBMS must be capable of the following functions:

(a) Provide access to transportation and decision aid models.

(b) Initialize and run the models.

(c) Generate output reports from the models.

(2) **Data Base Management System (DBMS).** The system must be capable of the following functions:

(a) Provide access to data by allowing queries, both direct (in plain English) and through a menu. The interpretation of plain English queries will be through the use of the HQDA DSS in-place software package called Intellect.

(b) Provide access to both the standard data base and to model output files. The system will also allow comparisons of data between like files.

(c) Allow the user to enter new data in the proper form to run a model.

(d) Allow the user to modify the model input files to conduct "what-if" analysis.

(3) **Dialogue Generation Management System (User Interface).** The interface among the DBMS, MBMS, and the system software must be capable of the following four functions:

(a) Feed a selected model with the appropriate data inputs as chosen by the user from a menu.

(b) Direct model output to the appropriate graphical/statistical software package configured such that it is in the format chosen by the user.

(c) Generate new "base case" model input files whenever a "parent" file is updated or replaced.

(d) Provide screens and menus for ease of use which meet the HQDA DSS standards.

b. **Strategic Mobility System Capabilities.** The SMM includes the capabilities shown below which are categorized under the subheadings of POM/Budget analysis, transportation analysis, force structure analysis, equipment distribution analysis, and transportation system capability

and readiness analysis. The specific methods by which the capabilities will be accomplished are defined in detail in Chapter 2, Design Concept, and Chapter 3, Discussion of Prototype.

(1) POM/Budget Analysis

(a) Display strategic mobility PDIP by type (e.g., LOTS) and quantity by FY for each major command (MACOM) with the capability to roll to Army level.

(b) Determine the impact of funding constraints on transportation initiatives by adjusting dollar cost with the associated transportation capability that will be enhanced or decremented.

(c) Determine how increases in POM budget authority can best be allocated to achieve the maximum benefit in terms of system capability or specific goals and objectives. These goals and objectives could be equated as changes in unit closures (LAD) or levels of sustainment.

(d) Integrate dollar costs with the type and quantity of strategic mobility system improvements required by fiscal year by showing dollar cost of each PDIP by type of PDIP for each MACOM.

(e) Integrate programed dollars with the type and quantity of strategic mobility resources they will buy.

(f) Provide action officer visibility of integrated programed dollars and strategic mobility system resources by PDIP for each MACOM by fiscal year.

(g) Integrate budgeted dollars with the type and quantity of strategic mobility system resources they will buy displayed by by PDIP by FY for each MACOM.

(2) Transportation Analysis

(a) Simulate the movement of forces and supplies through a multimodal, multitheater transportation system from "factory to foxhole" including the ability to model attrition to determine closure dates in theater and assess sufficiency of the transportation system capability. Model(s) must be capable of considering the following variables:

1. Combinations of possible constrained or unconstrained air/seaports of embarkation/debarkation.

2. Combinations of air/sea assets.

3. Various forces levels.

4. Wartime host nation support.

5. Overflight routes (route alternates).

(b) Quantify, display, compare, and evaluate the performance of nodes and links of a transportation network for CONUS, inter/intratheater and multitheater scenarios. Based on this analysis, identify critical throughput shortfalls. Specifically, determine:

1. Relationship between air/sealift assets and closure times in deploying and redeploying forces from CONUS to an overseas theater, and from one overseas theater of operations to another.

2. Combinations of air/land and sea routes between two theaters/locations.

3. Possible combinations of air and sealift assets required to meet a specific range of closure dates, for each route or combination of routes.

4. Deployment estimates by air and sea for various units.

5. Impact of various lift combinations on deployment.

6. Impact of various POMCUS levels in terms of lift requirements and force closure dates.

(c) Conduct inter/intratheater lift assessments capable of determining:

1. Deviation of estimated delivery dates from required delivery dates for each theater.

2. Queue length and idle time for each node and lift mode.

3. Deployment estimates by air and/or sea for various type units or a specific force.

4. Utilization of lift assets (general percent reports and specific ship and plane load information).

5. Limiting factors in overall system output.

(3) Force Structure Analysis

(a) Determine the TOE cargo movement capability of transportation units by SRC/UIC.

(b) Identify specific cargo configuration for loading specified lift assets.

(c) Compare old TOE and new TOE in order to assess transportability impacts.

(d) Determine movement requirements and capabilities by program year and compare output in the form of changes from on year to another.

(4) Equipment Distribution Analysis

(a) Determine the impact of equipment and personnel changes of the programed or current force in terms of movement requirements.

(b) Determine specific unit movement requirements in terms of amount of cargo/PAX to be moved by unit type/SRC.

(5) Transportation System Capability and Readiness Analysis

(a) Compare transportation unit status with previously reported status.

(b) Determine unit movement requirements and characteristics from sources such as TUCHA or TAEDP. Movement requirements will be identified in terms of amount of passengers and amount of cargo required to be moved. Cargo will be characterized by STON (bulk, oversize, outsize, and nonair-transportable), nonvehicular cargo, containerizable, and noncontainerizable cargo.

1-3. CURRENT PROCEDURES AND PROCESSES. Presently, action officers screen voluminous documents in order to determine what is needed to support Army force requirements and the transportation system's capability to support that requirement. The DCSLOG Strategic Mobility Division prepares position papers, impact statements, information papers, and briefings to support the development of the Five Year Defense Plan (FYDP), The Army Plan (TAP), and the Program Objective Memorandum (POM). The office develops, reviews, and defends strategic mobility PDIPs for the Army POM. They review PDIPs submitted by the MACOM and other DA Staff elements, present briefings to justify the PDIPs before the functional panels, and develop impact statements of program and budget changes. In accomplishing these tasks, DALO-TSM routinely reviews recurring and special studies for identification of transportation requirements, reviews Defense Guidance, evaluates results of mobilization exercises, coordinates issues with MACOM action officers, and reviews PDIP Dictionary pages to maintain status of initiatives.

a. Deficiencies and Limitations of the Current System. The overall deficiency of the current system is its inability to perform timely quantitative Strategic Mobility and Transportation analysis. The Army Strategic Mobility System Assessment (ASMSA) Study began the preliminary design for the development of an analytic methodology for providing strategic mobility input to the PPBES through use of a DSS. The ASMSA Study was the feasibility study which determined that a DSS was the most effective way to meet TSM requirements. DALO-TSM action officers (AO), team chiefs and the division chief were interviewed to learn how they accomplished their responsibilities. The interviews concentrated on the strategic mobility mission and functions. An analysis of the interview resulted in the following observations:

(1) There exists a lack of supporting automation to perform timely and meaningful review and analysis.

(2) There is great reliance on multiple levels of information.

(3) Data that is available is often aggregated or disaggregated at an unacceptable level of specificity; for example, table of organization and equipment (TOE) data is highly detailed in microfiche format.

(4) There is no easy way for the AO to graphically represent data.

(5) There is no systematic method to conduct sensitivity analysis ("what ifs").

(6) Current transportation models used by the strategic mobility and analytic communities are mainframe models requiring long run times and are unresponsive to the needs of ARSTAF AOs.

(7) No capability exists to analytically determine how to redistribute funding to maximize total system capability, or demonstrate the impact of incremental funding changes on the total system capability.

Accordingly, transportation issues often do not compete favorably with other programs because ODCSLOG is not able to adequately assess impacts of program changes, define risk levels, or develop tradeoffs. Moreover, impacts of tradeoffs and the interrelationship of various programs are often not apparent to the action officer.

b. Existing Data Flow. The information network, depicted in Figure 1-2, shows the existing data flow and the various sources of input and output of the existing system. DCSLOG, Strategic Mobility Division is represented by the center box. As can be seen, the data requirements to support the planning and programing functions are satisfied from a wide range of organizations. The data sources depicted below (Figure 1-2) are only representative of the total requirement.

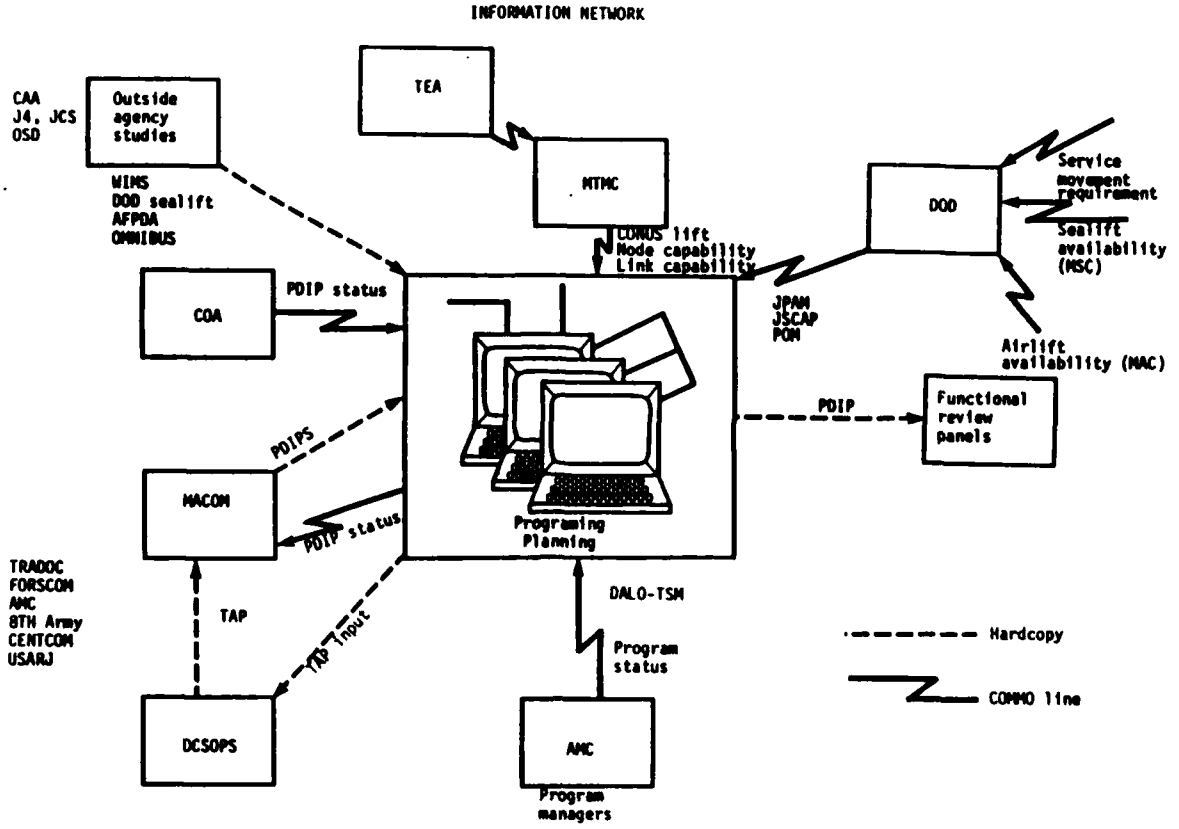


Figure 1-2. Information Network

1-4. OBJECTIVES. The major objective of the SMM is to provide data and quantitative analytic support to ODCSLOG to accomplish review and analysis of strategic mobility issues and to support HQDA in Planning, Programing, Budgeting and Execution System matters impacting upon strategic mobility issues.

a. General goals include the following:

(1) Development, analysis, and evaluation of the policy alternatives on strategic mobility issues to provide balanced support for the combat forces.

(2) Development of priorities for implementation of strategic mobility initiatives to improve the transportation system.

(3) Evaluation and analysis of the strategic mobility impact on military operations to deploy and sustain the total force based upon POM guidance.

(4) Evaluation and analysis of the strategic mobility impact of management changes upon the size and composition of the total force structure.

(5) Visibility in monitoring the readiness of transportation units to determine the effect on capability to support and sustain combat forces.

(6) The ability to simulate the movement of forces and supplies through a constrained multimodal transportation system to determine unit arrival times at destinations in a single or multiple theater of operations. Through this simulation or other model, determine the optimum distribution of funding for PDIPs to best improve overall transportation system capabilities.

(7) Determine the effect of PDIP funding level changes and policy changes on the closure of units overseas.

b. To accomplish these goals, the SMM is geared to satisfying the functional and operational requirements that were identified earlier and relate to the following categories POM/Budget Analysis, Transportation Analysis, Force Structure Analysis, Equipment Distribution Analysis, and Transportation System Capability and Readiness Analysis.

(1) **POM/Budget Analysis.** The objectives related to POM/budget analysis are:

(a) Display strategic mobility PDIP by type (i.e., LOTS) and quantity by FY for each MACOM with the capability to roll to Army level.

(b) Determine the impact of funding constraints on transportation initiatives by adjusting dollar cost with the associated transportation capability that will be enhanced or decremented. The resultant changes in capability could then be used as new input to be run in a transportation model contained in the Transportation Analysis option.

(c) Determine how increases in POM budget authority can best be allocated to achieve the maximum benefit in terms of system capability or specific goals and objectives. These goals and objectives could be equated as changes in unit closures (LAD) or levels of sustainment. By adjusting increases or decreases in in funding levels which have been translated to transportation capabilities, sensitivity analysis could be conducted with the transportation models reflecting different levels of strategic lift assets. A comparison of the arrival profiles would be made based upon the multiple model runs.

(d) Integrate dollar costs with the type and quantity of strategic mobility system improvements required by fiscal year by showing dollar cost of each PDIP by type of PDIP for each MACOM.

(e) Integrate programed dollars with the type and quantity of strategic mobility resources they will buy.

(f) Provide action officer visibility of integrated programed dollars and strategic mobility system resources by PDIP for each MACOM by fiscal year.

(g) Integrate budgeted dollars with the type and quantity of strategic mobility system resources they will buy displayed by PDIP by FY for each MACOM.

(h) Determine how PDIPs affect (improve) the strategic mobility system in terms of network flow throughout the entire system.

(2) **Transportation Analysis.** The objective related to transportation analysis is to develop a model base management system containing a set of transportation simulation models and other decision aid models which are made available to the user in an interactive environment. The models interact with the data bases to draw their input data, and interact with the host computer's library of graphic and statistical packages to produce output. The interface among these various systems will be panel driven and invisible to the user. Four transportation simulation models and a multiattribute utility model have been identified as the initial models for the system, and are described below. They are Mini-MIDAS, SHAKER, MOVER, Airlift/Sealift, and a to-be-developed decision aid for rank-ordering PDIPs. Additional models are also identified and described in Appendix E, and are candidates for inclusion in the system. The models selected will be capable of:

(a) Simulating the movement of forces, personnel, and supplies through a multimodel, multitheater transportation system (both forward and rearward) to capable of considering the following variables:

1. Combination of possible air/seaports of embarkation/debarkation. This could be done with multiple runs of the model using data from the PORTS and APORTS file to modify model input for certain APOE/SPOE and APOD/SPOD.

2. Combination of (decremented) air/sea assets. By modifying the quantities of strategic lift assets identified in the ASSET file, multiple runs at various levels of strategic availability could be run to show sensitivity in closure times as a function of lift capability.

3. Various forces levels. Same as above, but adjustment of the movement requirements contained in JPAM would demonstrate the sensitivity of the system performance with increases or decreases in the movement requirements.

4. Iterative wartime host nation support.

5. Iterative overflight routes (alternate routes). Actual links (routes) and nodes (ports, tranship points) will be capable of being adjusted to represent denial of overflight routes and nonavailability of certain air or seaports.

(b) Quantifying, displaying, comparing, and evaluating the performance of nodes, and links of a transportation network.

(c) Conducting inter/intratheater lift assessments capable of determining deviation of estimated delivery dates from required delivery dates for each theater. This will be accomplished by a Cargo Closure Report detailing deployment for each unit/cargo package by POE, POD, transportation mode, required delivery date, closure day, cargo weight, number of passengers, and cargo type.

(3) Force Structure Analysis. The objectives relating to force structure analysis will be to:

(a) Determine the lift capability of transportation units by SRC/UIC by accessing the Master TOE File and TAADS to determine major equipment items (task vehicles, etc.) and converting this into a transportation capability (e.g., numbers of containers discharged per day, STON of cargo discharged per day).

(b) Identify specific cargo configuration for loading specified lift assets. This will be accomplished by accessing the AMDF file and Transportation Reference data for weight, cube, and bulk/oversize/ outsize dimensions for a particular cargo commodity identified by stock number.

c. Compare old TOE and new TOE in order to assess transportability impacts. Access to the TAADS, TUCHA, TAEDP, and TOE data files will provide the capability to determine changes in levels of equipment and personnel. Comparison can be made to determine any increase/decrease in movement requirements expressed in number of personnel and amount of bulk/oversize/outsize cargo.

d. Determine all movement requirements (both personnel and equipment) and capabilities by program year and compare output in the form of changes from one year to another by using JPAM data. Movement requirements can be compared in terms of quantity of cargo to be moved by theater of operations. Accessing the ASSETS file would provide the capability to display strategic lift resources by POE by time period and mobilization condition.

(4) Equipment Distribution Analysis. The objectives relating to equipment distribution analysis will be to:

(a) Determine the impact of equipment and personnel changes of the programed or current force in terms of movement requirements.

(b) Determine specific unit movement requirements in terms of amount of cargo/PAX to be moved by unit type/SRC by accessing JPAM and TUCHA data files.

(5) Transportation System Capability and Readiness Analysis. The objectives relating to transportation system capability and readiness analysis will be to:

(a) Compare transportation unit status with previously reported status. Readiness and activation of transportation units are capable of being tracked by accessing the TAADS and FAS data bases. This will allow tracking by unit number, unit name, component/DODAAC, UIC, EDate, and location, authorized, and onhand equipment. Actual unit readiness ratings could be tracked with access to the FORSTAT file

(b) Determine unit movement requirements and characteristics from sources such as TUCHA or TAEDP. Movement requirements will be identified in terms of amount of passengers and amount of cargo required to be moved. Cargo will be characterized by STON (bulk, oversize, outsize and nonair-transportable), nonvehicular cargo, containerizable, and noncontainerizable cargo.

CHAPTER 2

DESIGN CONCEPT

2-1. SYSTEM DESCRIPTION. This section describes the long-term capabilities of the Strategic Mobility Module (SMM) by defining the operating characteristics and scenario for the system.

a. This system description is aimed at defining the SMM as it will function in the intermediate term LOG DSS. This view of the system is intended to ensure that development is consistent with the long-term requirements of DCSLOG Strategic Mobility Division and to serve as building block to including all these capabilities within the module. The ultimate Strategic Mobility Module of the LOG DSS is described in Chapter 3, Prototype Description, and is the ultimate objective of this intermediate design and system implementation.

b. The SMM should be designed to provide a user-friendly automated system capable of analyzing the transportation system in terms of its subsystems, deployment plans for units, items and personnel shipped, and the interrelated PPBES. When fully implemented, it will allow action officers the capability to consolidate visibility over mobility enhancement programs and assess the impact of changes in program/budget funding levels on the performance of the total transportation system. The SMM will provide the capability to identify transportation shortfalls by means of mathematical and simulation models and provide the basis for recommendations to resolve shortfalls. To meet the functional and operational requirements described in Chapter 1 of this paper, a design has been developed for the SMM that consists of three submodules that function together to produce a timely and useful system that will provide action officers interactive access and manipulation of data bases, and the ability to perform "what-if" analyses using mathematical and statistical models while allowing control over the decisionmaking process. These three submodules are the Systems Management Submodule (SMS), Management Information System Submodule (MISS), and Transportation Models Submodule (TMS).

c. In the future, the Strategic Mobility Module of the LOG DSS will contain not only transportation analysis simulation models and a decision aid, but also a "factory to foxhole" global transportation model to be used in budget programing analysis. This new model will also have the capability to translate PDIP funding level changes into physical asset changes (e.g., translate a loss of $1M in the LOTS PDIP into a degradation in LOTS operations for a specific port) and automatically input such changes into the model for an analysis of the effect on the overall output of the transportation system. The new model will be able to rank-order PDIPs in terms of overall benefit to the transportation system, and recommend new capabilities which might be even more beneficial to the system. Model output will be detailed enough to determine exactly where bottlenecks and stoppages occur, as well as provide detailed system performance reports. The future model is thoroughly described in Chapter 3 and Appendix E.

2-2. SYSTEM FUNCTIONS. The SMM submodules allow the user of the system to model policies, programs, and constraints, perform "what-if" analyses, and compare the results of these analyses by means of graphical and tabular output through a user-friendly, menu-driven MIS. The system submodules are summarized below. Figure 2-1 is a graphical overview of the functioning of the SMM submodules.

a. Management Information System Submodule (MISS). The MISS is designed to permit access and user tailored information retrieval to common LOG DSS data bases as well as the SMM unique data base; it contains a comprehensive data base management system.

(1) Access to these data bases will be constructed with a series of menu driven queries for strategic mobility data. More adept users will have the capability to directly access data by use of the "Intellect" software package installed on HQDA DSS.

(2) The MISS will include a report generator which will permit users to specify the reports that they require with minimum technical coding. It will allow users to tailor reports in tabular and graphical format. Other reports will be menu-generated as a matter of routine within the system.

(3) The MISS will have access to files created by the Systems Management Submodule and Transportation Submodule for queries and display of data. This submodule is built around a "data base" or group of data bases.

(4) The module will be constructed to permit data base maintenance in order to keep the data current and accurate. Procedures must be provided to insert new records, amend existing records, delete old records, and produce proof lists. Many of the insertions, amendments, and deletions will be carried out as part of applications in the Systems Management Submodule. Proof lists will be kept which will record details of transactions to enable systems administrators to keep track of what has happened to the data bases and make sure all the changes are valid.

b. Transportation Model Submodule (TMS). The TMS is designed to allow access to deterministic and stochastic simulation and mathematical transportation models capable of providing a quick and reliable means of conducting sensitivity and decision support analysis of the movement of cargo from home station to DISCOM and return. This submodule is a model base management system.

(1) Included in the module will be a capability to use multiattribute decision utility tools in order to rank order/prioritize PDIPs and assess the impact of resource change proposals on programs which affect the total system capability.

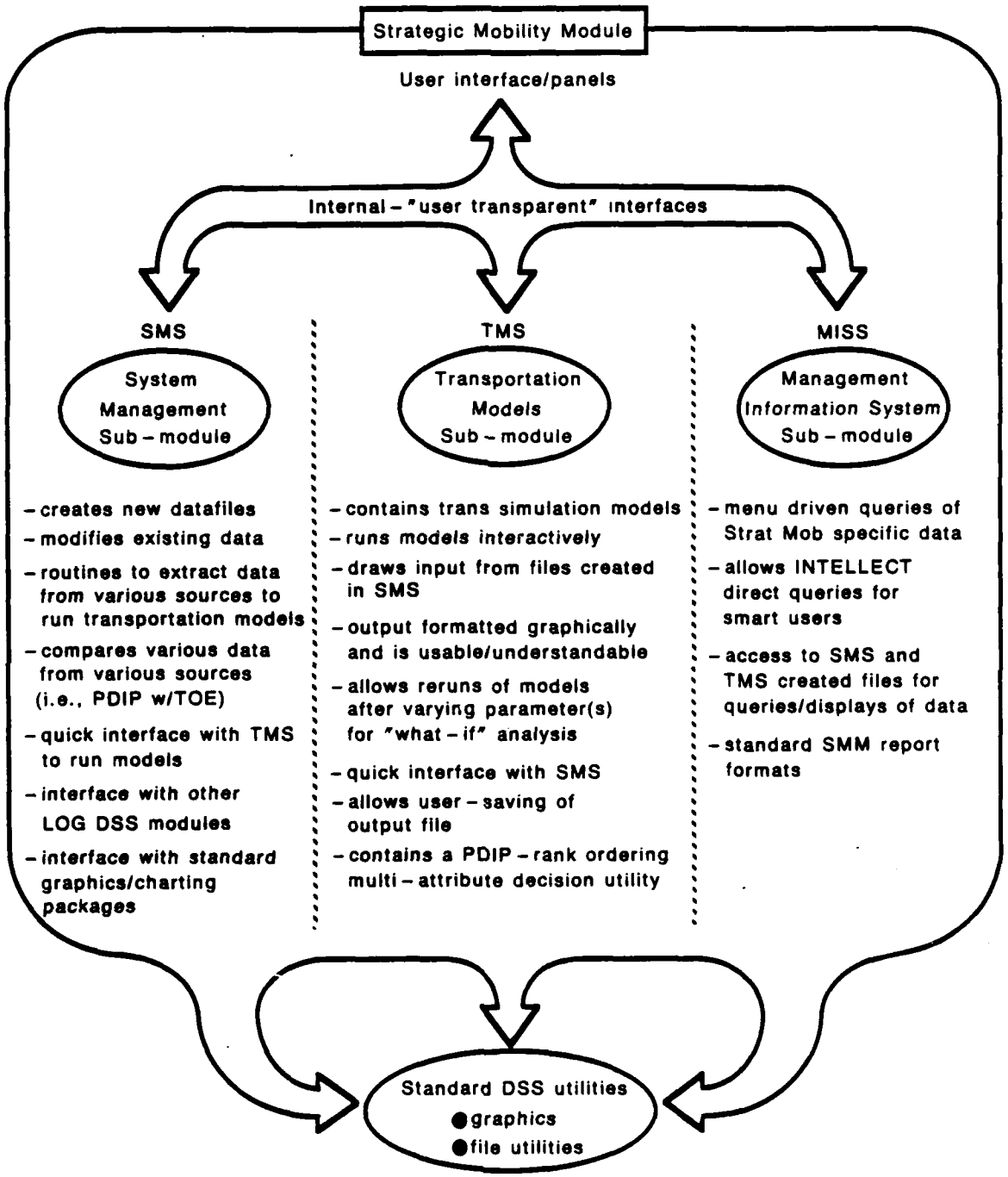


Figure 2-1. Strategic Mobility Module (SMM)

(2) The TMS will initially consist of PC-based models transferred to the mainframe. Examples of the initial PC models that will be part of the TMS are Mini-MIDAS, MOVER, SHAKER and Airlift/Sealift Model (DALO-TSM). It is recognized that all of the requirements specified in Chapter 1 will not be satisfied by the functioning of the models identified above. Accordingly, other existing models are identified and described in Appendix E, along with the four specified above, as candidates for inclusion in the Transportation Models Submodule as part of the model base management system.

(3) The TMS provides access to and initializes the attached models and interactively runs user-specified models and data sets by means of user friendly/menu driven interaction. The TMS is capable of accessing the MISS and the remainder of the LOG DSS to create data sets. This data will be generated by the Systems Management Submodule. The crosswalk between the TMS, MISS and SMS will be transparent to the user who merely controls system operation through menu-driven user interface screens. Figure 2-2 depicts the conceptual operation of the TSM. The models will be capable of generating standard reports and interface with HQDA DSS graphics. The operating environment to be developed is characterized by the following operational design criteria:

(a) **Flexibility and Ease of Use.** Modifications and parameters of the models may be modified before and after runs.

(b) **Quick Turnaround.** Module and models provide quick results for single or multiple runs. *Output for analysis* is generated in less than 30 minutes.

(c) **Uncomplicated Input.** User is able to select default data, or enter data sets using a menu-driven edit routine.

(d) **User-controlled Parameters.** The user controls both scenario parameters, such as cargo category, arrival data, assets, etc.

(e) **User-friendly, Menu-driven System.** System consists of detailed input screens to allow the user to easily access different functions within the models.

(f) **Integrated/Standalone Models.** Each model is designed to function independently; however, the output of one model can be used as input to the other models. The user may also independently access any model through a series of menus. This enables the user to operate models sequentially or operate any single model over a number of sessions.

(g) **Retrieval Capability.** Model outputs can be saved into an action officer's disk for later retrieval.

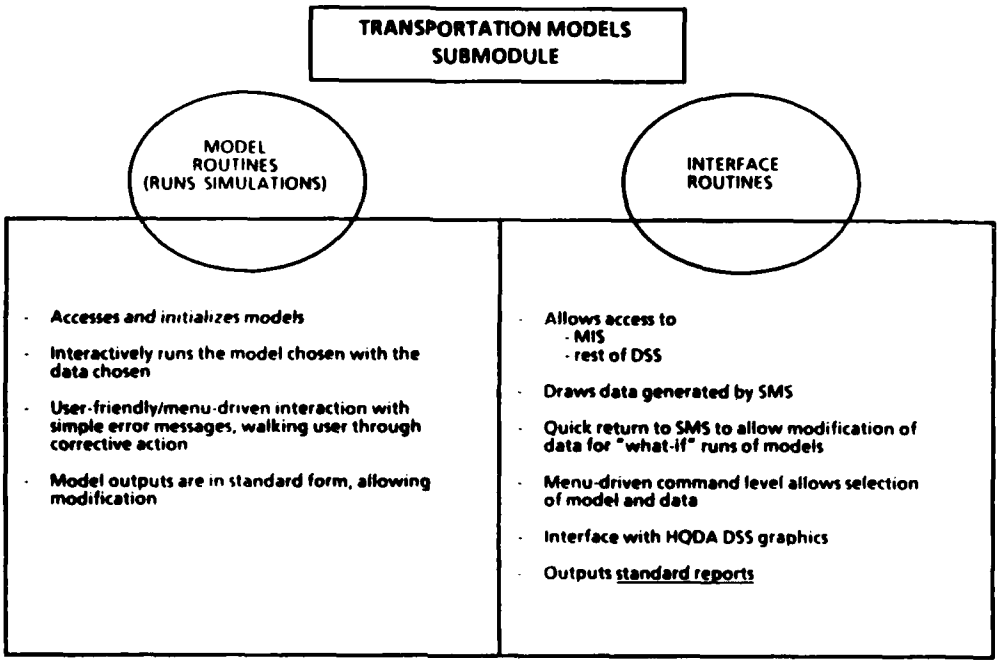


Figure 2-2. Transportation Models Submodule

(h) Standard Outputs. Standard outputs will consist of graphical reports and tables, selectable to the user through output selection screens. Output report generation will also allow the option of selecting the entire output of a model in tabular form for later detailed review. Outputs will interface with standard HQDA DSS graphical and statistical packages through the Systems Management Submodule (SMS).

c. Systems Management Submodule (SMS). The SMS, shown in Figure 2-3, is used to create new data files, modify existing data, and to extract data from various data bases to run the models in the TMS. In accomplishing these functions, the SMS consists of interface routines which allow for quick access to the the MISS, LOG DSS, and HQDA DSS.

(1) The SMS will have the capability to interface with standard HQDA DSS graphics and statistical packages.

(2) File creation routines must be capable of creating Structured Query Language (SQL) data files for use in model input for the TMS. These files will be user created via user friendly input screens. In creating these files the SMS will draw data for the models from several files, combine the selected fields, and create new record files.

(3) The SMS will create "base case" files which are created automatically whenever a "parent" file is updated. The capability to save older versions of the updated file is required to permit comparisons of different runs.

(4) File modification routines will exist which will allow the user access to files that have been previously created for use in model runs in order to make changes to data to perform "what-if" analyses. After changes have been made, they will be saved as a new file without altering the original master data.

(5) "Base case" files which are to be used as model input are described below; these capabilities are more thoroughly described in Chapter 3.

(a) For intertheater models, the "base case" data will contain data drawn from several sources, primarily the JPAM file. For each theater, a separate input file for the model will be created (in essence, a base case for each theater). The output of the model resulting from "base case" data input will be used as a basis for analyzing changes in transportation policy, asset reallocation/ reduction/increases, or new asset production.

(b) For intratheater models, the "base case" data will use intertheater model outputs for movements requirements and transportation assets onhand, and other sources for the network. A separate base case will be needed for each port to be analyzed (for port models), for a standard set of LOTS scenarios (for LOTS models), and for each theater's internal transportation network (for other intratheater models).

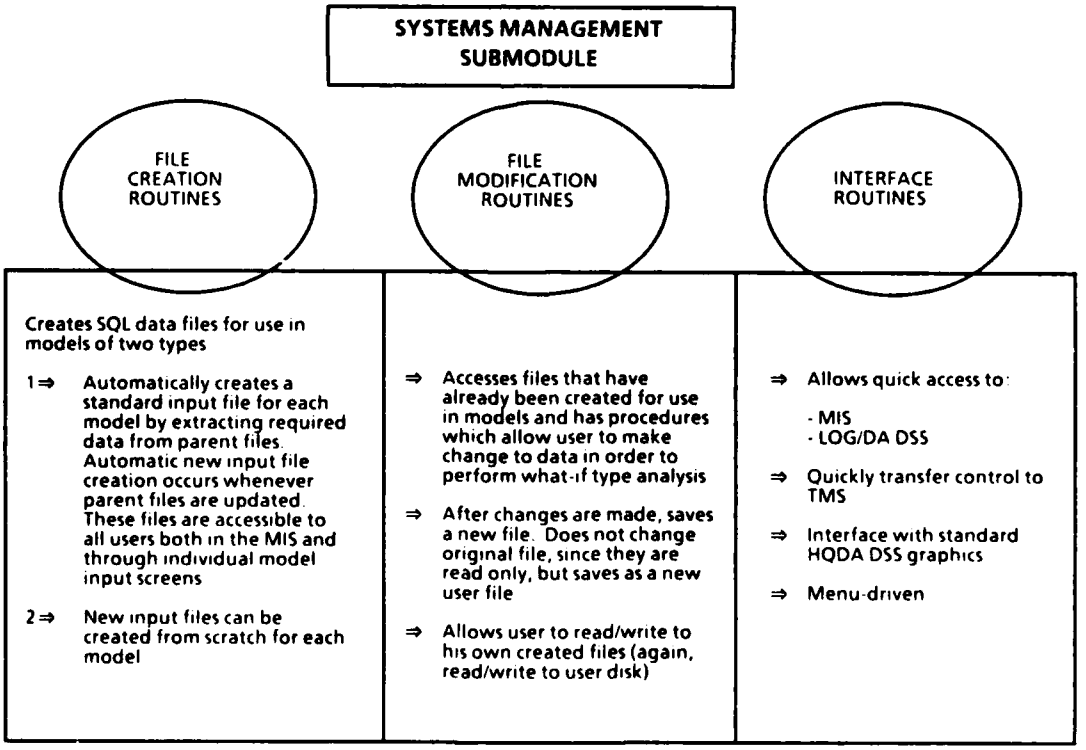


Figure 2-3. Systems Management Submodule

(c) CONUS mobilization and movements models will require standard base cases representing full mobilization and global movement based on JPAM data, partial mobilization, and no mobilization. CONUS network data is not currently automated but much of it is available in hard copy publications.

2-3. INPUT/OUTPUT DESCRIPTION. There are two basic categories of inputs and outputs of the SMM. These include data base-related and model-related input/output. The model-related input requirements rely heavily upon the development of data bases required to conduct simulation describing the movement of transportation assets to deploy forces and supplies through the transportation system. These data requirements are critical since the transportation simulation models have unique data input requirements. The SMM must be able to construct input files for each of the models, extracting the required data elements/fields from possibly several different data bases. These constructed input files must be accessible to the user in order to make changes to the files to run "what-if" analysis. There must exist a capability within the SMM to automatically create new input files for each model every time one of its "parent" files is updated by a data base manager. Whenever such a new set of input files is created, users will be alerted on each model input screen. Outputs will conform to the HQUA DSS standard graphical packages, and will also comply with the prototype standard. The possible outputs, their functions and required input data for the SMM are summarized in Table 2-1.

Table 2-1. Strategic Mobility System Design (page 1 of 5 pages)

Primary outputs	Output data types	Input data types	Input files	Function
PDIP data	Funding levels source Funding ($) for each fiscal year past year current year five planning years Major Command Codes Functional area Staff Proponent Program Codes FCN Codes	Title Number Funding ($) in each fiscal year past year curent year five planning years Major Command Codes Functional area Staff Proponent Program Codes FCN Codes	User input RDAIS PBS AMDF	Research a PDIP's funding levels, details
TOE comparison	Unit type TOE number Major equipment items Stock number Description Number of officers Number of enlisted	Unit type TOE number Major equipment items Stock number Description Number of officers Number of enlisted	TOE MTOE FORSTAT TAADS	Compare TOEs of transportation units
Readiness comparison	EOH Maintenance Training level Narrative	UIC Unit name Unit number	SACS FORSTAT FAS TAADS	Track readiness transportation units
Transportation equipment data	Ship type Mobilization condition Earliest avail date Ship ID Ship classification Ship speed Ship days available Ship fill Ships avail by plan	Ship type Mobilization condition Ship ID Ship classification Ship speed Ships available Ship fill Plan number	ASSETS CHSTR	Research transportation assets in inventory

Primary outputs	Output data types	Input data types	Input files	Function
Transportation equipment data (cont)	Aircraft type Aircraft ID Aircraft classification Aircraft available Aircraft mobilization condition Aircraft fill Aircraft out of theater	Aircraft type Aircraft ID Aircraft classification Aircraft available Ship mobilization condition		
Seaport data	Characteristics Geographical Location Code Harbor type Open storage capability Refrigerated storage capability Ammo storage capabilty Ammuniton breakbulk discharge capability Container discharge capability Number of entrances Ice restriction Container berths length depth Gen cargo berths	Port name Geographical Location Code Harbor Designation Harbor type Refrigerated storage capability Open storage capability Ammo storage capabilty Container discharge capability Number of entrances Number of harbors Number of berths general cargo container tanker Beach dimensions Beach distances	PORTS	Research seaports in Free World

Table 2-1. Strategic Mobility System Design (page 2 of 5 pages)

Primary outputs	Output data types	Input data types	Input files	Function
Seaport data (cont)	RORO berths Container berths beach dimensions Distance Number of harbors Tidal rise Turn basin Clearance Causeways and cargo capacity MHE capability			
Airport data	Characteristics Airport name Geographical location code Coordinates Country name Country code Load classification Date of classification or update Capability (off/on load) Current Potential Cargo throughput capability Current Potential Fuel Storage Capacity Jet AV GAS Characteristics IFR	Airport name Geographical location code Coordinates Country name Country code Load classification Date of classification or update Capability (off/on load) Current Potential Cargo throughput capability Current Potential Fuel Storage Capacity Jet AV GAS Characteristics IFR VFR	APORTS	Research airports in Free World

Primary outputs	Output data types	Input data types	Input files	Function
Airport data (cont)	VFR SQ FT Storage capacity PAX Receipt capacity Ammo storage area Parking Data Loaded Unloaded Sq Feet Surge Taxiway Width Length Surface Number of operating personnel	SQ FT Storage capacity PAX Receipt capacity Ammo storage area Parking Data Loaded Unloaded Sq Feet Surge Taxiway Width Length Surface Number of operating personnel		
Unit type movement characteristics data	Unit type code Unit type Unit name Deployment indicator Service Security classification Number of cargo categories Auth wartime personnel Nonorganic passengers Total cargo Bulk (STON/MTON) Oversize (STON/MTON) Outsize (STON/MTON)	Unit type code Unit type Unit name Deployment indicator Service Security classification Number of cargo categories Auth wartime personnel Nonorganic passengers Total cargo Bulk (STON/MTON) Oversize (STON/MTON) Outsize (STON/MTON)	TUCHA	Estimate movement characteristics of notional units

Table 2-1. Strategic Mobility System Design (page 3 of 5 pages)

Primary outputs	Output data types	Input data types	Input files	Function
Unit type movement characteristics data (cont)	Nonair transportable (STON/MTON) Bulk POL Cargo description Length Width Height SQ feet Number of pieces	Nonair transportable (STON/MTON) Bulk POL Cargo description Length Width Height SQ feet Number of pieces		
Movement requirement data	Unit name Sequence number Sevice Plan Mode of travel RDD Avail date Port date Node date POE (geolation data) Destination Number of PAX TPSN POD Accompanying supply/Ammo (STON) Bulk cargo (STON) Oversize cargo (STON) Outsize cargo (STON) Nonair transportatable cargo Unit type SRC Force requirement number UIC	Unit name Sequence number Sevice Plan Mode of travel RDD Avail date Port date Node date POE (geolation data) Destination Number of PAX TPSN POD Accompanying supply/Ammo (STON) Bulk cargo (STON) Oversize cargo (STON) Outsize cargo (STON) Nonair transportatable cargo Unit type SRC Force requirement number UIC	JPAM	Research movement requirements for unit equipment and resupply tonnages for projected POM Forces

Primary outputs	Output data types	Input data types	Input files	Function
MOVER Model Reports	Input data LOTS System requirements Total equipment required per day Ship discharge equip Lighterage equip Shore equip Peak day equip required by equipment type Personnel requirements Operating personnel Support personnel Inland movement profile # of pallets # of container	Arrival profile Berth arrival day ship number Ship type Number of vehicles Total vehicle weight Noncontainer weight Pallet weight Number of containers Offload category unit values STON per vehicle STON (ammo) per container STON (supply) per container STON per aircraft Daily discharge capacity (equipment productivity) Ship discharge equipment Lighterage equipment Shore equipment	JPAM ASSETS TUCHA User input	PDIP analysis Transportation system analysis
Airlift/Sealift Model	Lift requirements Deploy times	Cargo sizes Lift asset types Deployment times	ASSETS CHSTR User input	Transportation system analysis

Table 2-1. Strategic Mobility System Design (page 4 of 5 pages)

Primary outputs	Output data types	Input data types	Input files	Function
Airlift/Sealift Model (cont)	Outbound capacity Ton miles Pax miles Required number of aircraft Total cargo capacity Total ships required Origin to destination time	Airlift Cargo movement requirement STON passengers Daily utilization factor Block speed Average speed Aircraft type Oneway distance Number of days to deploy Sealift Ship types Number of ships Load factor (STON) Load time (days) Speed (nautical mph) Movement requirement (STON) Distance (POE to POD) Time to deploy (days)		

Primary outputs	Output data types	Input data types	Input files	Function
Mini MIDAS Model Reports Daily Sealift Activities Report Report of Requirement Demand and Deliveries Aircraft Utilization Report	Number of ships available POE Date Number of ships starting to load Number of ships loading Number of ships departing Number of ships in queue at SPOD Number of ships starting to offload Number of ships completing offload Percent utilization of ship's cargo/container capacity Number of ships departing Number of ships waiting for convoy to form Number of ships at sea Cargo requirement by RDD Actual delivered by day Excess Shortfall Aircraft type Number available by day Percent utilization Missions flown Number lost Amount of cargo and personnel delivered	Forces data - Unit type - Service - Origin - Destination - Avail date - RDD - Amt of cgo - Supply consumption factors User input - Unit ID - Deploy mode Airlift resources - #/types of aircraft - # of aircraft - Aircraft utilization factors - Aircraft speeds - Aircraft payloads - Aircraft avail profile Sealift resources Number of ships Initial locations Ship capacities Ship speed Transportation network Origins Destinations Seaports Airports Leg lengths/ distances	JPAM GEOLOC TUCHA ASSETS PORTS APORTS	PDIP analysis Transportation system analysis

Table 2-1. Strategic Mobility System Design (page 5 of 5 pages)

Primary outputs	Output data types	Input data types	Input files	Function
Rank-ordered PDIP list	PDIP ID/list Scores by PDIP IN each criteria Criteria relationships	PDIP ID Prompted relationships Criteria relationships (if required)	User input (PDIPs/scores) Criteria	Multiattribute decision utility for rank-ordered PDIPs
SHAKER Model Reports Utilization Reports Fixed Port by Berth Report LOTS site by Ship Discharge Anchorage Report Activity Reports Vessel Activity Report Berth Activity Report STATUS/Summary Reports Berth Activity Summary - Port Operating Report (daily berth status)	Type Berth Berth number Percent utilization Vessel number Ship type Arrival time Berthing time Berthing location Discharge start time Discharge end time Cargo discharged STONS Departure time Berth type Berth number Ship type Discharge start time Discharge end time	Ship name Vessel ID number Vessel type Vessel length Vessel beam Vessel draft Ship capacity Total capacity Ship deadweight Cargo deadweight Maximum deck square ft Twenty foot equiv units Unit equipment capacity Cargo name Cargo type weight square feet	JPAM ASSETS PORTS TUCHA User input	PDIP analysis Transportation system analysis

Primary outputs	Output data types	Input data types	Input files	Function
SHAKER Model Reports (cont)	Cargo data Type Pieces STONS Berth data Occupation data Time AVG/MIN/MAX Discharge operations Time AVG/MIN/MAX Berth type Date available Start Cleared	cube Number of lighter loading stations Number of holds Number of cranes per hold Number of berths Container Breakbulk Lighter RO/RO Number of anchorage points Distance to beach (miles) Length of beach (feet) Width of beach (feet) Beach gradient Tidal range Sea state condition Wind direction Wind speed		

2-4. DATA REQUIREMENTS. The availability and reliability of data are essential to the successful development of the Strategic Mobility Module. The critical task in developing the SMM is to develop a data base of manageable size and complexity that describes the transportation system in terms of the transportation network, movement requirements, capabilities, and interrelated PPBES. Furthermore, these data bases, or portions thereof, will be required to be used to run the transportation models resident to the Transportation Models Submodule. The sources and data requirements listed below are examples of the type of data required. Additional sources and elements will be required for module enhancement (such as for CONUS/Mobilization).

a. Army Master Data File (AMDF). The Army Master Data File is the catalog of items of materiel and supply in the Army inventory. It contains descriptive data on over one million active and one-half million inactive items. The file is maintained by the Catalog Data Agency at New Cumberland Army Depot and is available in tape format.

b. Joint Program Assessment Memorandum (JPAM). The JPAM data base contains programed movement requirements for each service. The data base for the Army details the Army strategic movement requirements for unit equipment and resupply tonnages for projected POM forces. The data includes the short tons, square feet, and measurement ton characteristics of each unit for containerizable cargo, vehicles, nonself-deploying aircraft, and other cargo that is noncontainerizable. It does not include the movement requirements for RC units moving form home station to mobilization station.

c. Joint Operational Planning System Reference Files (JOPS). JOPS Reference Files contain much of the planning information used to support and develop OPLANs. Files contain a wide range of data useful for strategic mobility planning analysis.

(1) Transportation Assets File (ASSETS). The Transportation Assets File lists strategic transportation resources by time period and mobilization condition that are available at predefined POEs. Information includes type and source of all military and commercial transportation assets used for strategic airlift and sealift. For airlift resources, the number of aircraft withheld for JCS-assured airlift (except CRAF) and the number remaining for planning are also given. This file reflects the figures in Annex J of Joint Strategic Capabilities Plan (JSCP).

(2) Geolocation File (GEOFILE). The GEOFILE contains data that specifically describes and geographically locates selected places and facilities. Information includes the location, name,type installation, country name and code, etc. Each entry is uniquely identified by a four-digit GEOLOC. The file can be used for selection of SPOE/SPOD and transshipment points, etc.

(3) Type Unit Characteristics File (TUCHA). The Type Unit Data File contains selected information about the number, size, and weight of personnel, supplies, and equipment possessed by notional military units. Data is highly aggregated. Each type of unit in this file is

uniquely identified by a five-digit unit type code (UTC). The Programed Force TUCHA File estimates the movement characteristics of units in the POM force based on equipment distribution schemes in the TAEDP. Information is available at the UIC level of detail.

(4) Ports Characteristics File (PORTS). This file contains the physical descriptions and operating characteristics of seaports throughout the free world. Information includes the size of the port, depth of the harbor entrance, beach data, number of berths available by ship type, and categories and capacities of cargo handling and storage facilities. Each seaport is identified by a specific GEOLOC.

(5) Aerial Ports and Air Operating Bases File (APORTS). This file contains the physical descriptions and operating characteristic of airport facilities throughout the free world. Information includes maximum aircraft on ground (MOG), runway length, width, and weight-bearing capacity, load classification number, aircraft parking space, and fuel/cargo storage capacities. Each airport is identified by a specific GEOLOC.

(6) Characteristics of Transportation Resource File (CHSTR). The Characteristics of Transportation Resource File describes essential standard characteristics of airlift and sealift resources. Two data sets are included in the files--the Airlift Data Set and the Sealift Data Set. The Airlift Data Set contains aircraft utilization rate, load classification number, passenger-carrying capacity, cargo-load capacity, and onload/offload time for each aircraft type. The Sealift Data Set describes ship categories and lists cargo stowage capacities (including number of passengers that can accompany cargo), onload/offload time and average ship speed for each category.

(7) Logistics Factors File (LFF). The LFF contains standard logistic planning factors and capabilities used to compute resupply requirements and shortfalls.

(8) Force Status and Identity Report (FORSTAT). The JCS-level FORSTAT system establishes a single source within the DOD to provide the National Command Authority authoritative identity and status information concerning units and organizations. The DCSOPS Army Operational Center collects the data and maintains the file. The file contains unit status reporting information for all Armed Forces units.

d. Force Accounting System (FAS). The Force Accounting System is a component of the DCSOPS Force Development Management Information System (FDMIS). The FAS is comprised of four major data files: (1) the Forces File (FORFA) contains current, programed and alternative planning forces (troop lists) embodying the Current Force File (P), the Master Force File (M), and the Program Objective Memorandum (POM) Force File (F); (2) the Notes File (NOTA) contains the Standard Requirements Code (SRC), the NOTA modifies the SRCs in the Forces File; (3) the Transaction History History File (THISA); and (4) the Manpower Annex File (MANX). The FAS maintain a single record for each unit identification code (UIC) for a particular effective date (EDATE). FAS provides the trooplists of the "real world" force structure, a budget

force for planning purposes, a program force supporting the Army Program Objective Memorandum to develop the budget force, and the objective force for Army input to the Joint Strategic Operation Plan (JSOP).

e. Total Army Equipment Distribution Program (TAEDP). The Total Army Equipment Distribution Program is used to determine the distribution of major end items to all claimants in the Total Army, prepositioned materiel configured to unit sets (POMCUS), prepositioned war reserve stock (PWRS), maintenance float, and operational project stocks. TAEDP is resident on the HQDA DSS.

f. The Research, Development and Acquisition Information System (RDAIS). The RDAIS includes the Research and Development Consolidated Data Base (RDACB), which contains detailed PDIP information. The RDAIS is currently undergoing a redesign.

g. Program Budget System (PBS). The Program Budget System (PBS) is an extensive data base maintained by the Army Comptroller which contains all data elements which comprise a PDIP.

h. Master Table of Organization and Equipment File. This file is the Master DA/TRADOC TOE File which depicts required personnel and equipment to fulfill minimum essential wartime requirements for each type unit by standard requirement code (SRC). Requirements are indicated at various TOE levels. The TOE serves as a model for actual units in the current force.

i. DA Standard Equipment Characteristics File (ECF). The purpose of this file is to provide a standard reference file for transportability characteristics descriptions by LIN for use in development of movement requirements. The file contains all type classified LIN included in Army TOE, MTOE, and in SB 700-20, Army Adopted/Other Items Selected for Authorization/List of Reportable Items. The ECF is developed by MTMCTEA and maintained at FORSCOM. Key data elements are LIN, NSN, model and component description, shipping configuration, number of pieces, dimensions, weight, cube, cargo loading indicators (aircraft and container).

j. US Army Operational Readiness Analysis (OMNIBUS). OMNIBUS evaluates the current capability of the Army to mobilize, deploy, fight, and sustain forces when mobilized to support global conflict as described in the Defense Guidance. OMNIBUS is a study conducted annually by CAA under the sponsorship of ODCSOPS. The OMNIBUS Force Tape is developed from several sources and is available at CAA.

k. Programed Airlift/Sealift Reserve File. This file projects airlift and sealift resources and capability in POM years. This file is useful for outyear analyses.

l. Structure and Composition System (SACS). The SACS is a network of computer programs merging four basic data files. These include FAS, Master TOE, Modified TOE, and Basis of Issue Plan (BOIP) File. SACS may be viewed as three separate modules, Basic, Personnel, and

Equipment modules. The LOGSACS (equipment module) is in late stages of loading onto the HQDA DSS and, when implemented, should satisfy the needs of the Strategic Mobility Module.

2-5. INTEGRATION WITHIN LOG DSS. The SMM must interface with all other modules in the LOG DSS. The principle modules that the SMM will need to interface with are the POM/Budget, Equipment, and Force Structure modules. The internal hierarchy will require the coordination of policies and guidance that affect multiple systems in the LOG DSS. Common data bases, policy parameter files, user controls, management information systems, and systems management capabilities will enhance the likelihood of interface with the entire LOG DSS. The management information system associated with the SMM will be integrated with the LOG DSS MIS Module.

2-6. INTEGRATION WITH SYSTEMS EXTERNAL TO LOG DSS. It is not totally clear at this time how much interface with systems external to the LOG DSS will be required. The data requirements of the SMM will, it is envisioned, be satisfied by the LOG DSS. It may, however, require periodic access to data external to the LOG DSS. In anticipating the final design requirements of the SMM it is expected that due to the potentially large volume of data of the JOPS files it may not be stored nor maintained within the LOG DSS. Accordingly, a method must be established for direct interaction with required data bases.

2-7. PERFORMANCE AND OPERATIONAL CRITERIA

a. Accuracy. It is assumed that the accuracy of the data files is acceptable, since they are used frequently for data analysis throughout DOD. It is also assumed that the accuracy of the models is acceptable, once each individual PC based model is accepted by DOD.

b. Validity. It is assumed that the models have been adequately verified and validated prior to acceptance by DOD.

c. Timing. The SMM will function in a manner consistent with the complete DSS. The models will have a run time of less than 30 minutes.

CHAPTER 3

DESCRIPTION OF PROTOTYPE

3-1. GENERAL. The prototype was developed using "storyboard" software on an IBM PC. A "storyboard" is a sequence of programed screens presented to the user to mimic the operation of the desired capability. The prototype takes the user through the HQDA DSS system, from the original DSS panel down to the Strategic Mobility Module, mirroring in most respects the actual functioning of the DSS. The functioning of each submodule is represented by introductory panels, input selection panels, and output report panels. No real computations, calculations, or data queries take place, but the user interface, inputs, and outputs of the prototype will be substantially the same as that of the final system, once implemented. The actual number of panels required for the functional system will be much greater than reflected in the prototype; these must be constructed during the system development phase.

3-2. USER INTRODUCTION. Figures 3-1 and 3-2 explain the use and purpose of the prototype. The prototype was developed by using "storyboard" personal computer software to create a functional representation of the desired module requirements. It was then provided to the sponsoring AOs, who were trained in its use. Upon their review, feedback was provided to the study team, who then iteratively revised the prototype until both the user and study team were satisfied with its functioning. A copy of the prototype diskette can be obtained by writing to US Army Concepts Analysis Agency, ATTN: CSCA-SPM, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

Strategic Mobility Module of
LogDSS; HQDA Decision Support System

Prototype Version 7 *31 Mar 87*

General Information and Instructions

1. This menu-driven prototype is d signed to resemble the HQDA Decision Support System user interface. The program is in a 'Storyboard' form.

2. The prototype is used to gain feedback from the sponsor and to help determine the functional design and inputs/outputs of the DSS module To do this effectively, you, the sponsor, should explore this prototype and make notes on how effectively the prototype would fill your needs if it were fielded with the capabilities and functions shown. Specifically, note how well/how poorly the screens depict:

- the data you desire to see as a result of running a model
- the types and formats of the various reports
- the logic and flow of the screens
- the degree of user friendliness you perceive
- the various options you are presented

After receiving your comments (either by phone or written) we will modify the program and return it to you. We will continue this process until the prototype meets your needs. To return to this screen at any time press Home

Press ENTER to continue

Figure 3-1. General Information 1

3. The screen manipulations will resemble Forecast closely, but not exactly. The delay times will not be identical; nor will the sounds.

4. Selections available to you are highlighted in yellow. Other selections presented in green are not available and are for illustration only. If you inadvertently press the wrong key, simply make selections from the screen you are then presented.

5. Some selections, such as choosing a data file to run with a model, are chosen in advance for you. They are not highlighted but are in flashing white-on-black. Do not use the spacebar or tab key to move within and among selections such as these as you do in the actual HQDA DSS.

6. There are no actual file or data manipulations behind these screens. The reports and files presented are for illustration only and are intended to elicit feedback from you, the final user of the Strategic Mobility Module.

7. For questions contact:

CPT Joseph W. Mislinski
MAJ Robert G. Albrecht
US Army Concepts Analysis Agency
Bethesda, MD
295-0257

To return to these screens at any time press Home; to end the run press Ctrl-Bk

Press ENTER to continue

Figure 3-2. General Information 2

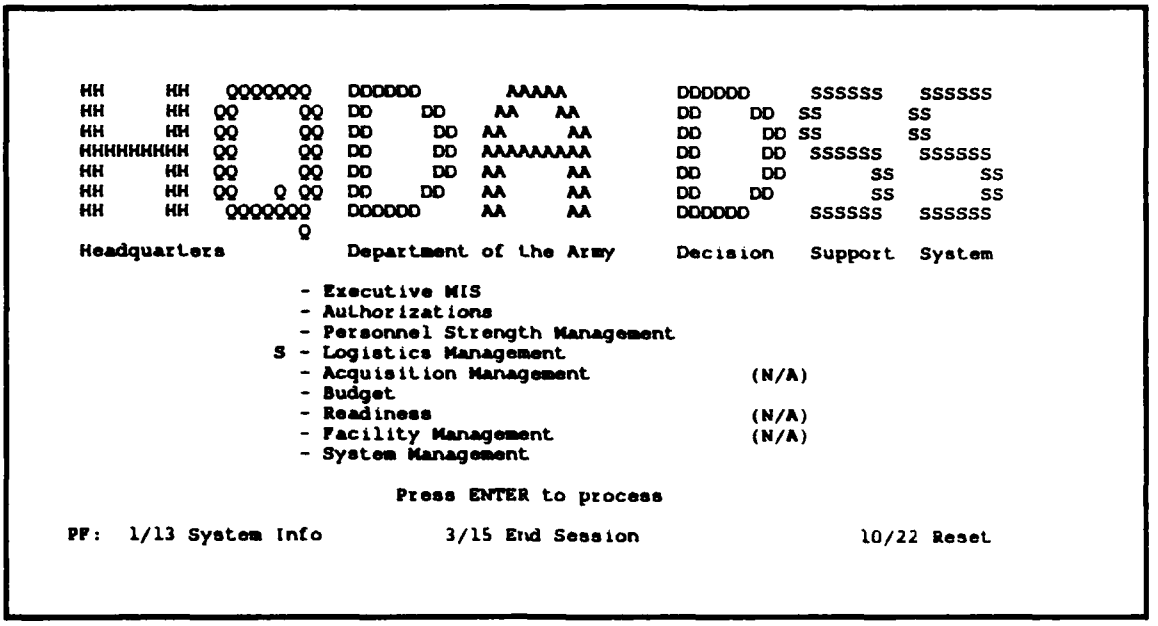


Figure 3-3. HQDA Decision Support System Main Menu

3-3. HQDA DSS ACCESS MENUS

a. Initially, the user logs on to the the HQDA computer system, and then selects the HQDA Decision Support Systems option. Access to the LOG DSS is through a panel similar to the one shown which contains the Logistics Management option. The panels were designed to meet the existing HQDA decision support system panel standards. A panel's system label is in the upper left corner, and program function (PF) keys at the bottom of a panel indicate functions which are available upon pressing the key shown. Generally, PF3 returns to the previous panel, and PF1 provides help information. For example, PF 1/13 indicates that the user could press either PF 1 or PF 13 to get system information.

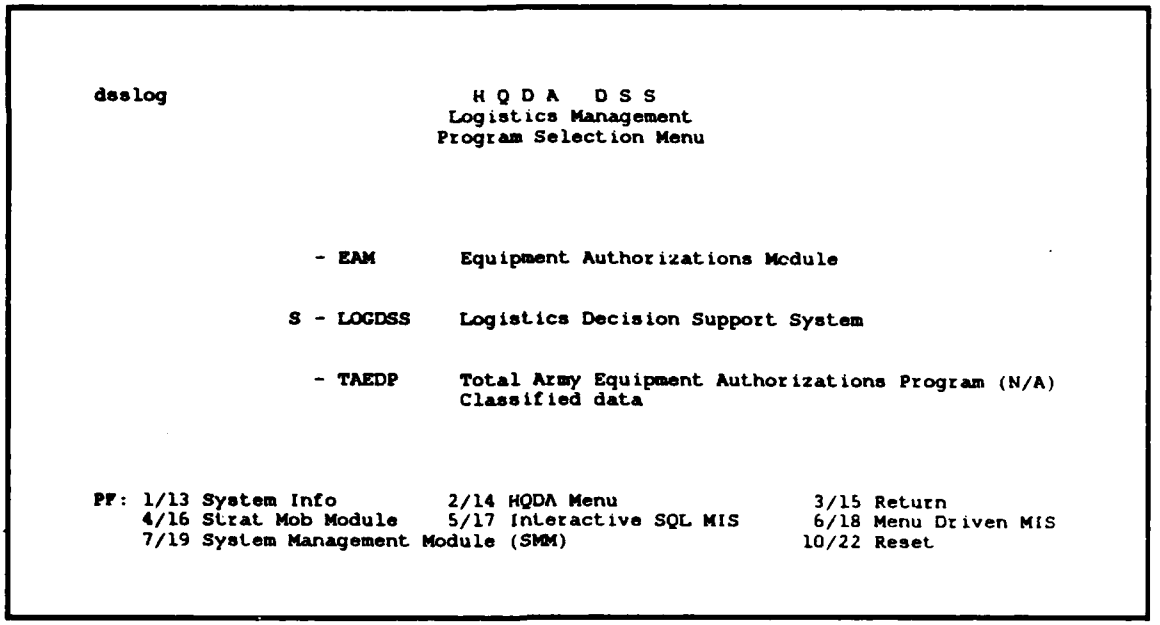


Figure 3-4. Logistics Management Main Menu

b. Once in the Logistics Management Option (Figure 3-4) of the HQDA Decision Support System, the user selects the Logistics Decision Support System Option, and then presses PF4 to enter the menu-driven Management Information System/Logistics Decision Support System.

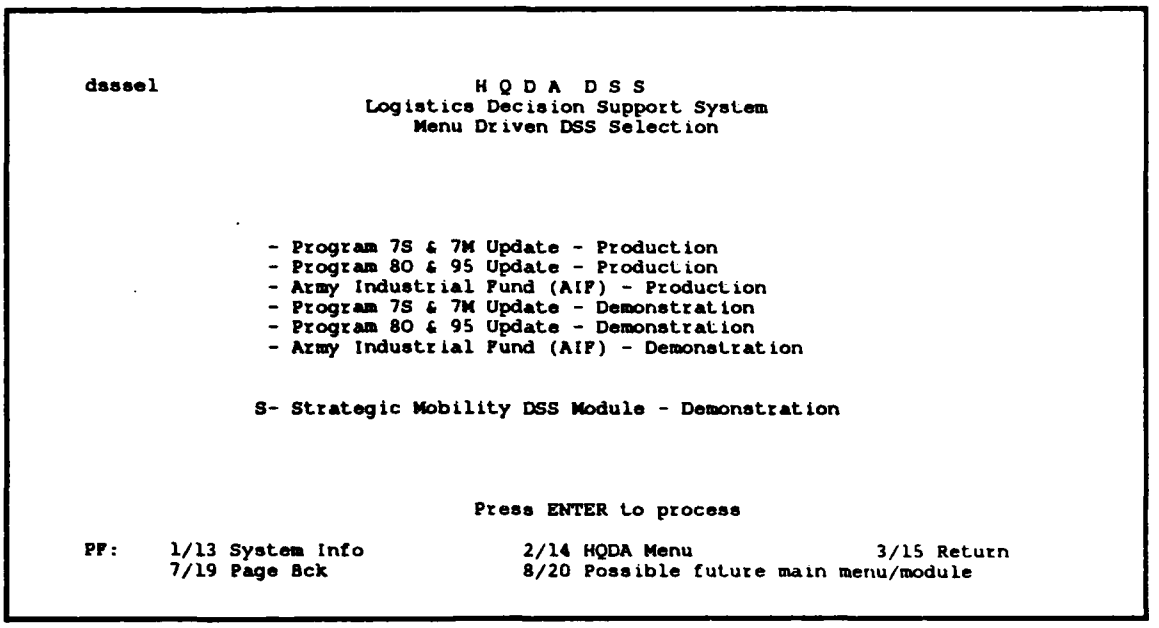


Figure 3-5. Logistics Decision Support System Main Menu

c. The current (as of March 1987) panel of the Logistics DSS is shown in Figure 3-5, with the addition of the Strategic Mobility Module.

d. The user has the option of returning to the main HQDA DSS menu, as well as the Logistics Management menu. For illustration purposes, the main menu of the future Strategic Mobility Module is accessible through PF8. This future module menu and explanatory slides are intended as illustrations of follow-on development to the current DSS development. The future capabilities would build upon, and not replace, the Strategic Mobility Module as described by the prototype, Functional Description, and Concept Paper. These future module slides are depicted in paragraph 3-13.

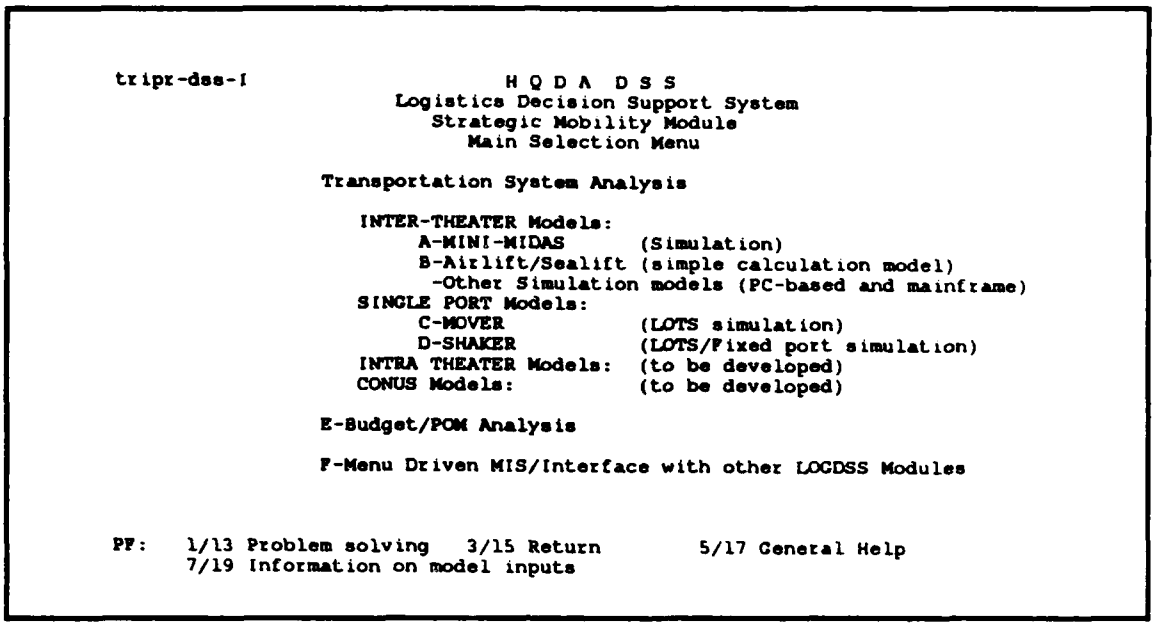


Figure 3-6. Strategic Mobility Module Main Menu

3-4. STRATEGIC MOBILITY MODULE. Figure 3-6 is the main menu of the Strategic Mobility Module for development during Phases II and III of the contract.

a. There are three main options on this panel. Additional help for each of these functions is available from the screen presented after selecting one of the above options. They are to:

(1) Conduct transportation system analysis by running a selected transportation model (see paragraph 3-5),

(2) Conduct POM/Budget analysis by entering the POM/Budget module for research into areas of strategic mobility interest (see paragraph 3-10),

(3) Enter the menu-driven Management Information System where queries may be done of the strategic mobility data base and also do functions of strategic mobility interest in other modules of the LOG DSS (see paragraph 3-11).

b. The help information available from this panel is as follows:

(1) How to Solve Typical Problems. Information such as this will be available to guide an action officer (AO) through problem solving.

(a) Budget Programing. How does a decrease in funding in a PDIP affect the transportation system/where can the reduced funding hurt the system least?

1. To answer this question, the action officer (AO) first needs to fully research the PDIP(s) in the MIS. She/he must translate that funding change into a capability change (i.e., a reduction in $4 million in LOTS procurement means three fewer lighters for Pusan, ROK).

2. The AO would then choose an appropriate transportation simulation model to use for analysis. In this case, MOVER or SHAKER might be appropriate.

3. The AO would then modify the model's base case input parameters to reflect the changed capability. In this case, subtract three lighters from Pusan.

4. Run the selected model, and then compare outputs to the standard base case. After running the model, it might be seen that a unit would miss its RDD by 10 days.

(b) Data/File queries. Example: what is the readiness of 4th Transportation Command subordinate units?

1. To answer this question the AO must first determine if the question asked is available on the MIS menu. If it is, she/he would make the appropriate selections and enter the prompted information.

2. If the selection is not available on the menu, the AO would have to choose a data file, enter it in Intellect, and make her/his query in plain English.

(c) Transportation System Analysis. Example: what effect does the addition of five new RO/RO ships have on the closure of units in Europe? To answer this question, the AO follows most of the same steps in budget programing analysis, however, she/he does not have to convert PDIPs into capabilities. She/he simply modifies a model's inputs (adding five RO/RO ships to the Mini-MIDAS input file) and runs the model. Then the model output is compared to that of the base case to determine the overall effect.

(d) Rank ordering PDIPs. Make this selection on the main menu and read the explanation.

(e) Information concerning each model can be found after selecting a model.

(2) Information Concerning the Base Case Set of Inputs for Models.

(a) Each simulation/model must have a standard set of reports and outputs for a given situation against which a "what-if" analysis may be compared. For example, for the JPAM European theater of operations for a budget year, a model user may want to determine the impact of changing the table of organization and equipment (TOE) of a unit being moved (in other words, changing the movement requirement in terms of numbers of troops and/or size and amount of equipment due to a TOE change). To do this, there must exist a basis from which to

change. (It would be undesirable to manually enter a new set of input parameters each time a model is run.)

(b) The base case set of inputs consists of a set of movement requirements, a set of transportation assets and a transportation network. The movement requirements and assets are generally from a modified JPAM file, while the network data is taken from the Office of the Secretary of Defense (OSD). The process is intended to be similar to the JPAM process.

(c) For the planning years, the JPAM data is adequate. However, for the program, budget, and current years, the JPAM data is out of date due to actual programing and/or budget changes. For the current year, the budget not only has been subject to change, but may not have been executed in the manner foreseen. Therefore, for the current year, the OMNIBUS force tape is used because it reflects current movement requirements for the current force. All these factors result in continual changes to the base case of each model and must be handled by the system manager. In general, the base case inputs of the models are taken from the different sources for the following years. In Table 3-1 below, the FYs are shown for work done during FY 87.

Table 3-1. Base Inputs for Analysis During FY 87

Year for analysis		FY	Years out	Initial inputs from
The current year	Current force	87	0	OMNIBUS force tape year 0*
The budget year	Budget force	88	1	JPAM for year 1*
The program year	Program force	89-93	1-5	JPAM for year 1-5*

*Input data for these years must be modified to reflect actual system capabilities based on programing, budget and execution changes, as they occur.

(d) For an action officer to conduct current analysis on the effect of a change in policy for a given year, he must use the correct year's base case. The base case of the current year will show current capabilities, while the base case for future years will each show different capabilities (hopefully increased capabilities each year in the future).

c. These panels (Figures 3-7 through 3-9) depict the concept behind the force structure for the various years of PPBES. The force and its movement requirements serve as inputs for the base case. Each model's output must be specifically formatted to serve as input to the next model in the chain (Figure 3-11).

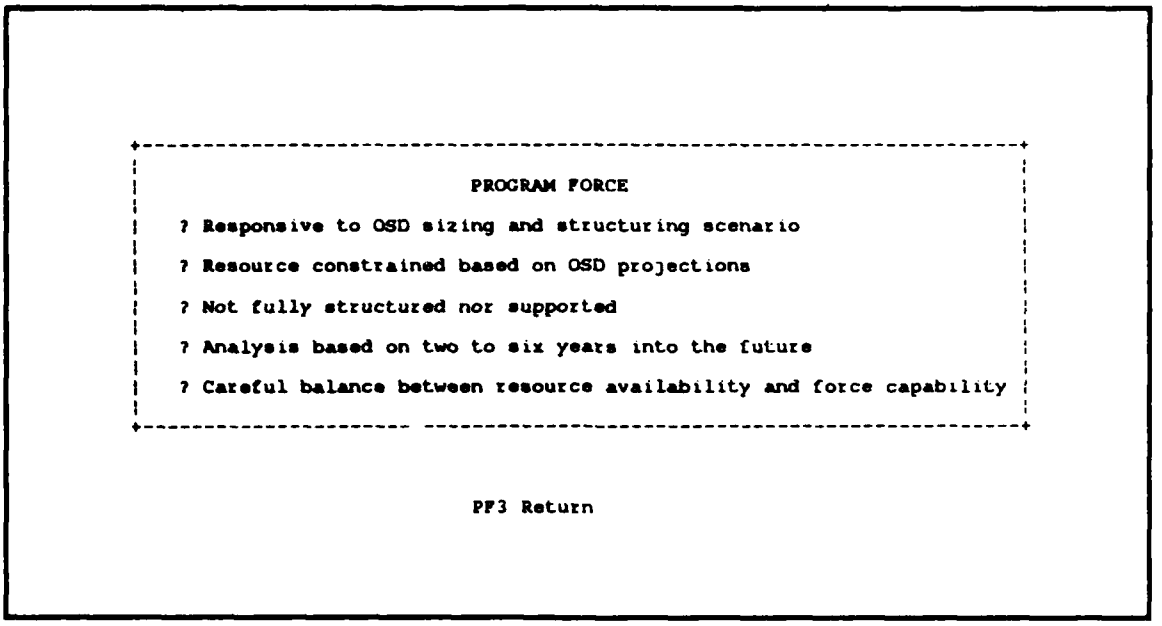


Figure 3-7. Program Force

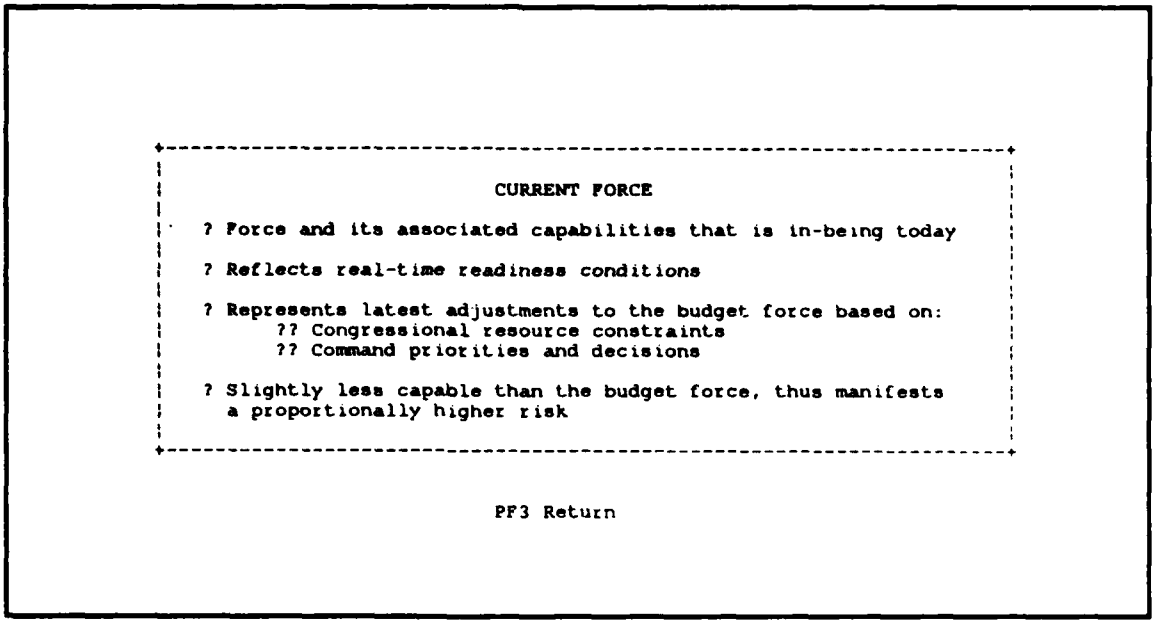


Figure 3-8. Current Force

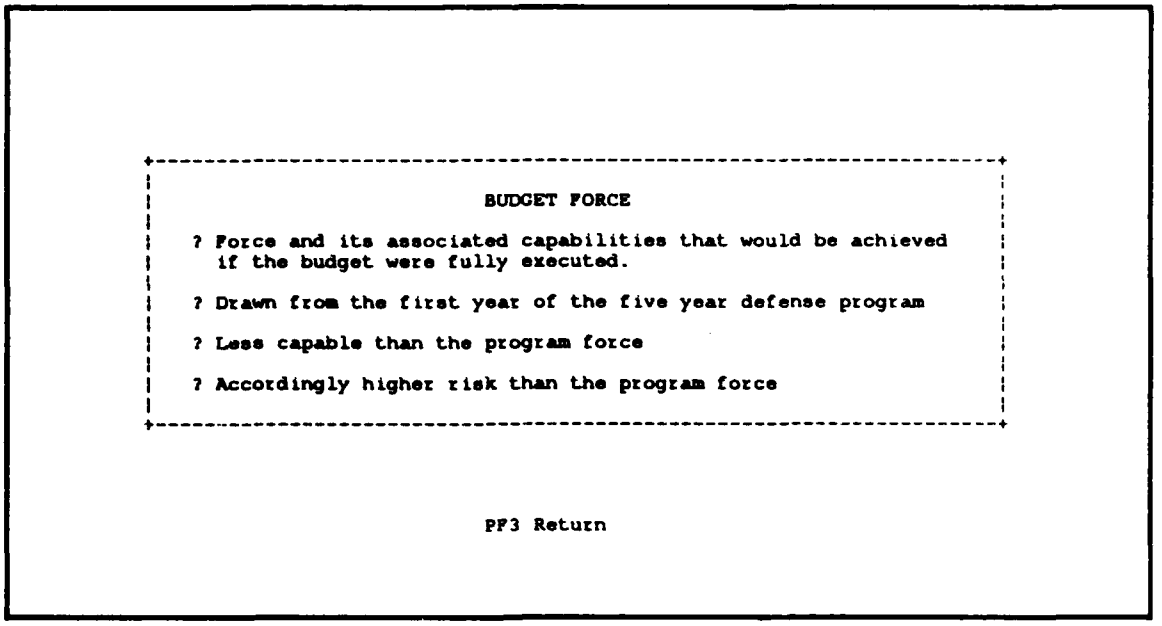


Figure 3-9. Budget Force

Transportation Analysis Option

Concept of Model Functioning

The concept for the initial data inputs for developing a 'base case' report for each model has been explained in previous screens. Here, the linkage between individual models is explained.

There is currently no model which adequately addresses CONUS mobilization and movement. Base case inputs are intended to drive this CONUS and mobilization model. The base case input consists of movement requirements, assets and the transportation network, expressed in terms of a date which particular cargo must be at its CONUS POE, and a date for it to be at its overseas POD. Since the POEs are specified, the CONUS model is run to insure that the force can in fact meet its required POE date, and if not, modify that POE date for input into an intratheater model.

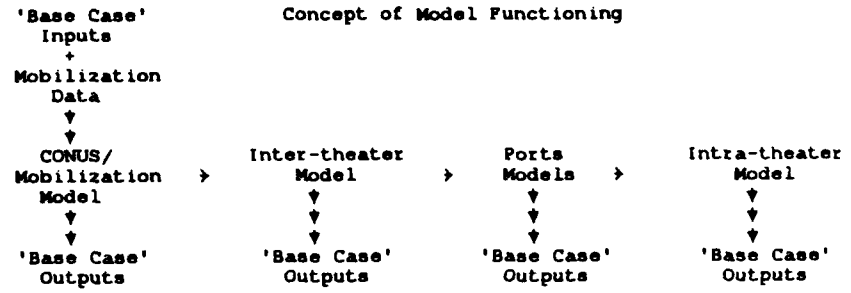
Hence, the output of the CONUS model is used to drive the intertheater model. The output of the intertheater leg is used as input to the various port and intratheater models, as shown graphically on the next help screen.

ENTER to continue PF3 to return

Figure 3-10. Concept of Models - Panel 1

Transportation Analysis Option

Concept of Model Functioning



One set of 'Base Case' outputs is maintained for each model for each of the Current, Programing and Budget years, against which changes can be compared.

The base case inputs must be constantly updated to reflect current funding approvals for PDIPs and budget execution, so that the base case outputs also reflect the current situation for each year.

PF3 Return

Figure 3-11. Concept of Models - Panel 2

3-5. TRANSPORTATION SYSTEM ANALYSIS OPTION. As part of the prototype, these two panels (Figures 3-10 and 3-11) explain the linkage of models and graphically depict the process.

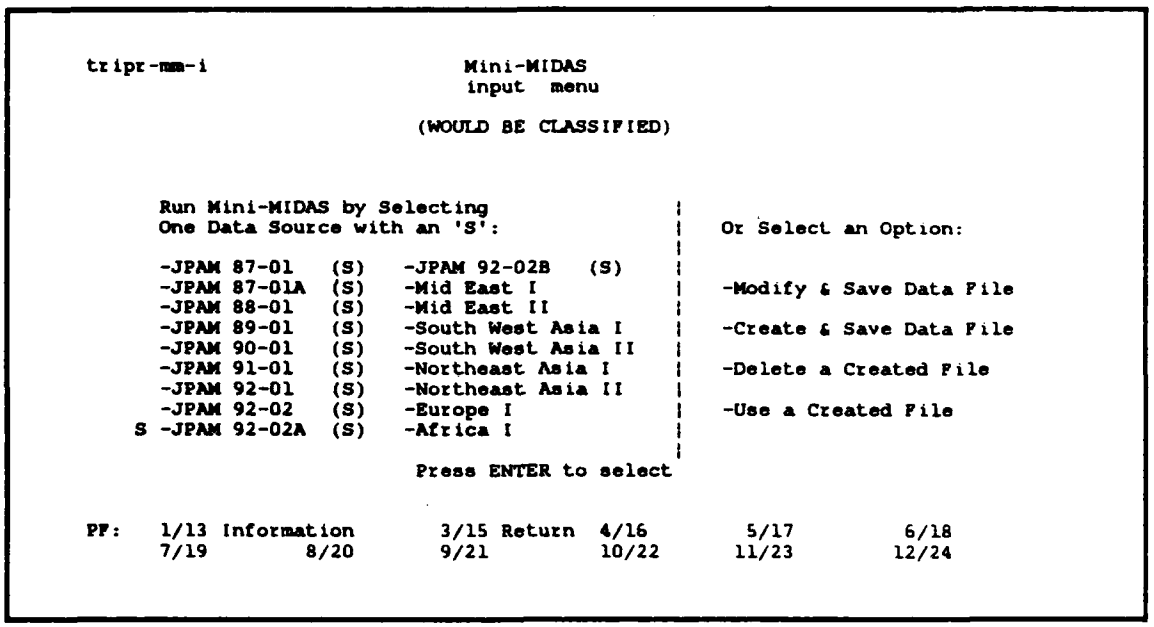


Figure 3-12. Mini-MIDAS Main Menu

3-6. INTERTHEATER MODEL - MINI-MIDAS. Figure 3-12 shows the access panel for the Mini-MIDAS Model.

a. Mini-MIDAS is an intertheater deployment model which was originally designed for a personal computer, but will be put on the LOG DSS due to the need to perform quick analysis in aggregate form. The purpose of the model is to supplement the capabilities provided by the Model for Intertheater Deployment by Air and Sea (MIDAS) which is used annually for budget planning. The normal inputs (transportation assets and movement requirements) are provided from the Joint Program Assessment Memorandum (JPAM).

b. The inputs to the Mini-MIDAS are determined by the user. A standard set of inputs for a given theater may be modified and determine the impact of the change(s). Generally, the user could modify the movement requirements to determine how long and/or how well the force closes on the theater, or she/he could research a program increment and modify either the capabilities of the network or transportation assets to evaluate that change.

c. In order to assess the impact of any change to the normal inputs, a base case set of inputs is required against which to compare any change you may have made. An explanation of the base case inputs is given on an input information panel accessible from the main model menu.

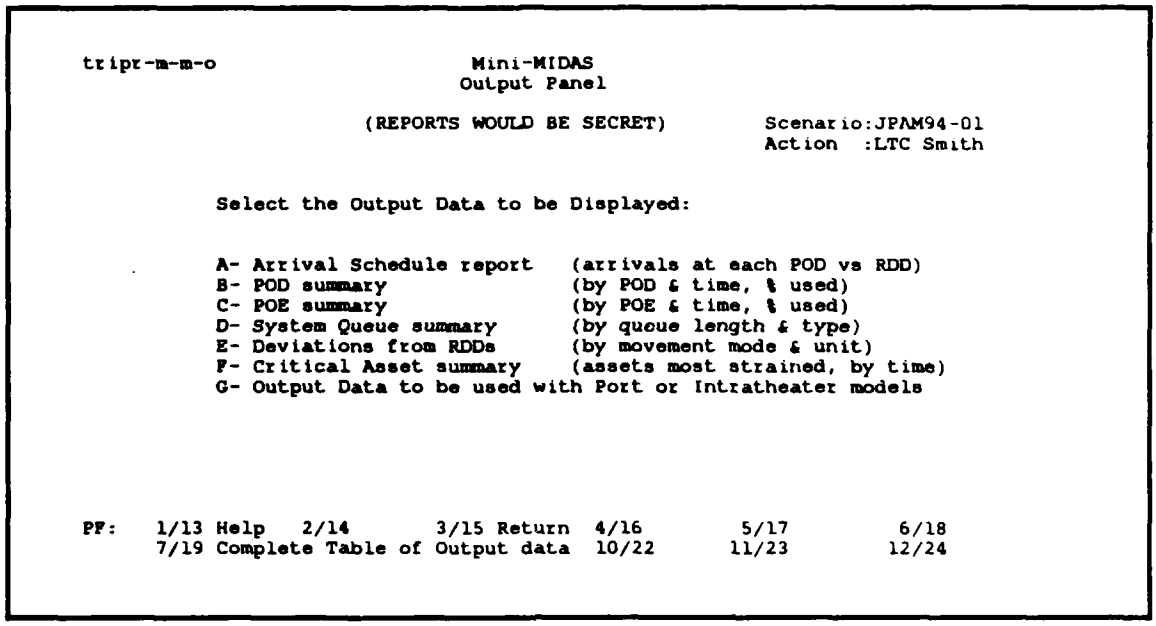


Figure 3-13. Mini-MIDAS Output Report Selection Menu

d. Mini-MIDAS Output Report Information. Figure 3-13 allows the user to choose an output report.

(1) Once the model has run, an output report must be selected. The output data which is used to make up the reports is identified by the name of the action officer who generated it, as well as the set of input data which was used. The action officer would also have the opportunity to view all of the model's output data in tabular form.

(2) The output of this model may be used as input for a port or intratheater model by selecting option G.

(3) For each report, the option will exist to reformat the report into another type of graphic, i.e., a pie chart, bar chart or line diagram.

(4) The output reports are shown in Figures 3-14 through 3-20.

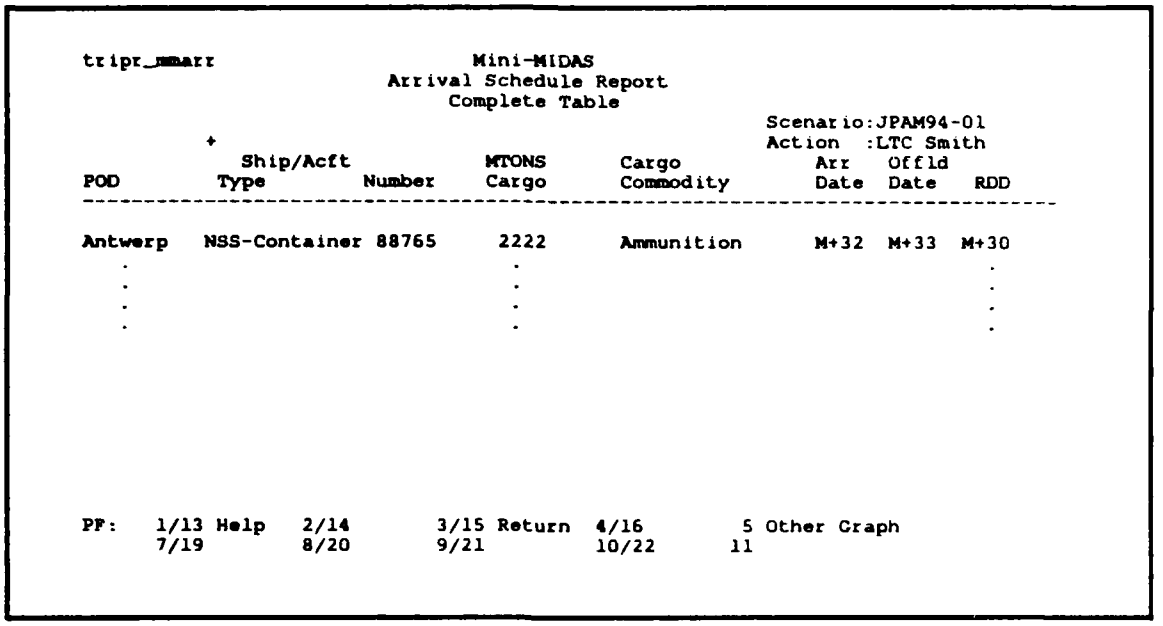


Figure 3-14. Arrival Schedule Report

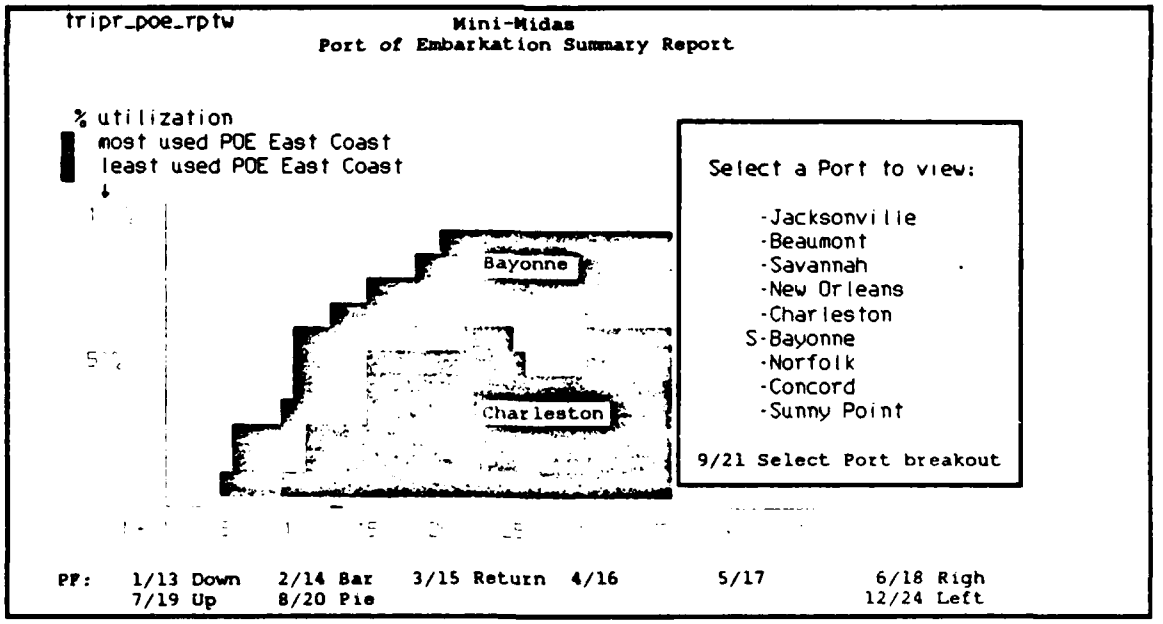


Figure 3-15. POE Summary Report

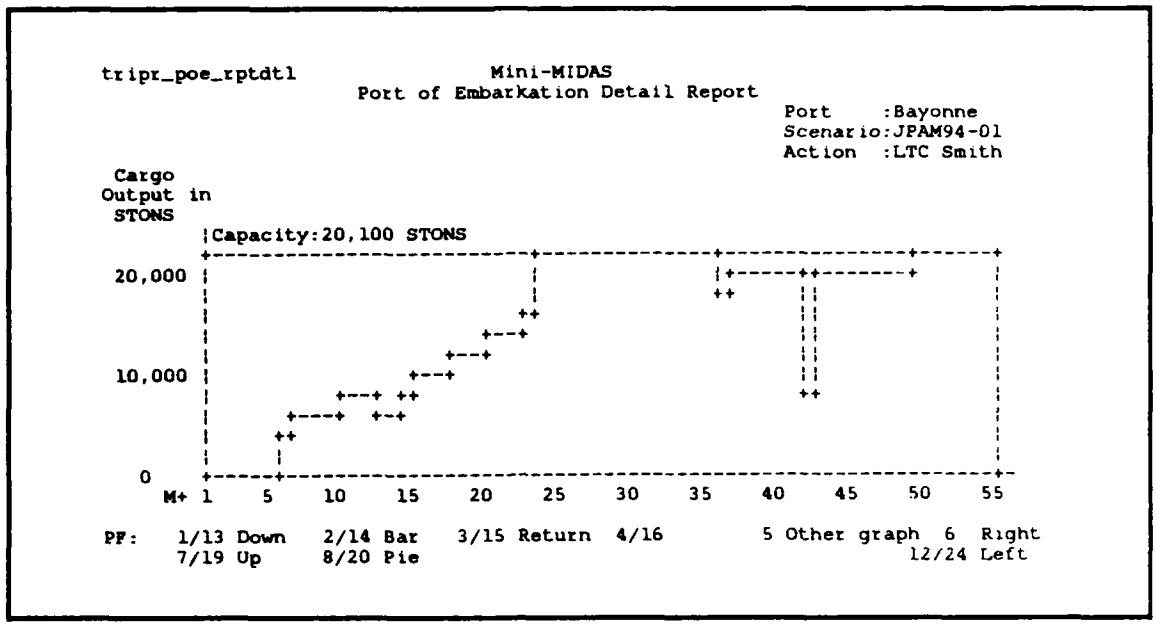


Figure 3-16. POD Detail Report

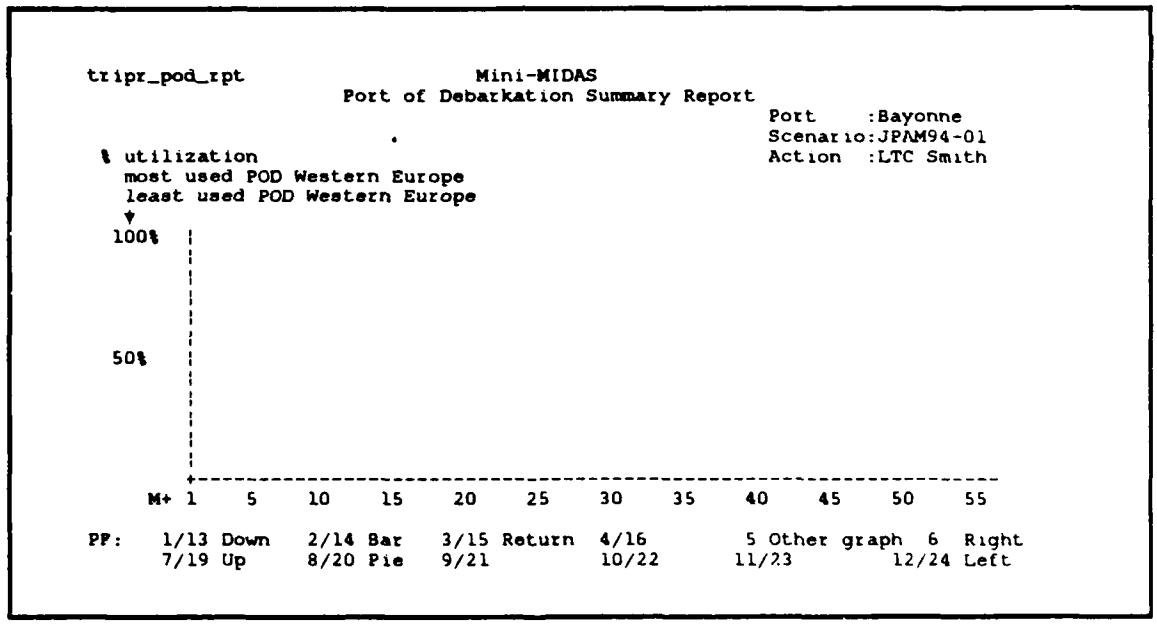


Figure 3-17. POD Summary Report

```
tripr_Q_RPT

                                Mini-MIDAS
                                                        Scenario:JPAM94-01
                        Queue Length & Location Report  Action  :LTC Smith

                                                  D+day
                                                  WAIT
     LOCATION       SHIP TYPE IN QUEUE          STARTS ENDS     CARGO ON BOARD
     --------       ------------------          ------------    ------------------

     Amsterdam      NSS Container Ship          24     27       Unit Equipment
     Amsterdam      NSS Breakbulk               24     27       Ammunition
     Amsterdam      NSS Breakbulk               24     28       Ammunition
                          .                                          .
                          .                                          .
                          .                                          .
                          .                                          .


PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22      11/23          12/24 Left
```

Figure 3-18. Queue Report

```
tripr_mm-rdd                    Mini-MIDAS
                    Required Delivery Date Summary Report

                                                        Scenario:JPAM94-01
                                                        Action  :LTC Smith
                                  Departure
Unit UIC Name     Origin    Plan  Act    POE          POD       RDD  Actual Arr
--------- ----    ------    ----  ----   -----------  --------  ---  ----------

WQQQAA    2AD     Ft Hood   M+32  M+34   New Orleans  Antwerp   M+40 M+42

  .                             .                                      .
  .                             .                                      .
  .                             .                                      .
  .                             .                                      .


PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph
      7/19 Up     8/20 Pie   9/21 Detailed Mvmt Schedule sel unit
```

Figure 3-19. RDD Summary Report

```
tripr_mm-aset                    Mini-MIDAS
                  Critical Asset Utilization Summary Report

                                                  Scenario:JPAM94-01
                                                  Action  :LTC Smith

Asset Type        Number of days                                Unit
                  100% utilized   Origin  Destination  Cargo    Serving
----------        --------------  ------  -----------  -----    --------

SL-7 fast RORO         36         Bayonne  Antwerp     Unit Equip  2AD
      .                                                           .
      .                                                           .
      .                                                           .

PF:   1/13 Down   2/14       3/15 Return  4/16        5 Other graph
      7/19 Up     8/20       9/21         10/22      11/23
```

Figure 3-20. Asset Utilization Report

```
tripr-airsea-i          Airlift/Sealift Model
                              Input Panel


FIRST  Select a model:
                        A-Airlift model
                         -Sealift model (essentially operates like airlift)

       And select your option:

                        C-Determine transportation assets required
                              (user provides cargo to be moved, number
                               of days to deploy, and distance)
                        D-Determine number of days to deploy
                              (user provides cargo to be moved, quantity
                               of assets available, and distance)
                        E-Change the characteristics of transportation assets

                        F-Reset asset characteristics back to default values


PF:   1/13 Help   2/14      3/15 Return  4/16       5/17       6/18
      7/19        8/20      9/21         10/22      11/23      12/24
```

Figure 3-21. Airlift/Sealift Main Menu

3-7. AIRLIFT/SEALIFT MODEL

a. The Airlift/Sealift Model was developed by an action officer at DALO-TSM to conduct quick response analyses of the strategic movement of specified cargo. The model is a modified LOTUS spreadsheet which calculates either the number of each type asset needed to meet a specified delivery date, or the number of days required to deploy a specified cargo given limited assets.

b. The model does not assign cargo to aircraft or ships; the user must do that implicitly. The user has the choice of either "default" ship and aircraft characteristics (speed, payload, type of cargo) or modifying those characteristics to meet his needs.

c. For options C and D in Figure 3-21, input panels and their respective output reports are represented in Figures 3-22 through 3-25. Although not totally depicted in this report, the Sealift part of the model functions in the same manner as the Airlift part of the model. Input data could come from actual OPLANs or notionally generated in order to determine new requirements or capabilities.

```
tripr-Alft/Slft-rqmt      Airlift/Sealift Model
                              Input Panel

                    Aircraft Requirements Input Panel

General Information:
              For each type aircraft, you will be presented with a screen
identical to this one.  You would enter cargo to be moved, the number of days to
deploy and the distance to be travelled, each followed by an ENTER.

                                AIRCRAFT:  C5-B

+--------------------------------+ +-------------------------------------+
|       Cargo to be moved        | |           Deployment                |
|       (Outsized allowed)       | |           Requirement               |
|                                | |                                     |
|  Number of passengers:         | |  Number of days to deploy:          |
|                                | |                                     |
|  Short Tons of Cargo :         | |  Deployment distance miles:         |
|                                | |                                     |
+--------------------------------+ +-------------------------------------+

PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18
      7/19 Finished entering - report      10/22       11/23       12/24
```

Figure 3-22. Aircraft Requirements Input Panel

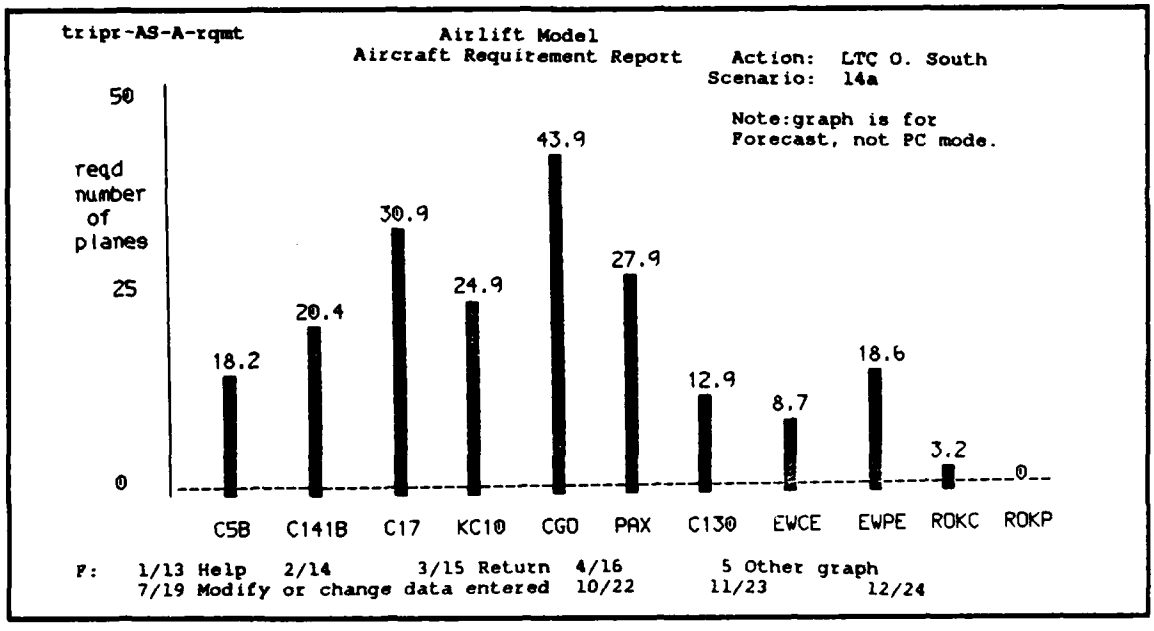


Figure 3-23. Aircraft Requirements Report

```
tripr-Alft/Slft-deploy     Airlift/Sealift Model
                                Input Panel

                    Days to Deploy by Air Input Panel

General Information:
            For each type aircraft, you will be presented with a screen
identical to this one.  You would enter cargo to be moved, the number of
aircraft available and the distance to be travelled, each followed by an ENTER.

                                AIRCRAFT:  C5-B

+--------------------------------+ +--------------------------------------+
|       Cargo to be moved        | |            Deployment                |
|       (Outsized allowed)       | |            Information               |
|                                | |                                      |
|  Number of passengers:         | |  Number of aircraft avail:           |
|                                | |                                      |
|  Short Tons of Cargo :         | |  Deployment distance miles:          |
|                                | |                                      |
+--------------------------------+ +--------------------------------------+

PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18
      7/19 Finished entering - report      10/22       11/23       12/24
```

Figure 3-24. Days to Deploy by Air Input Panel

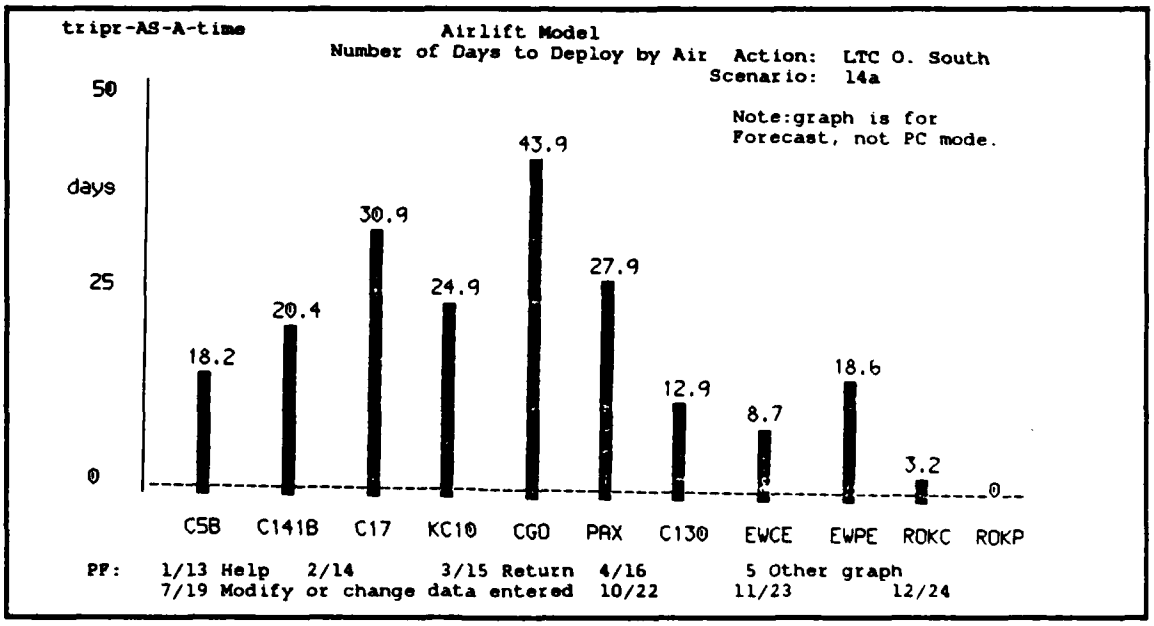


Figure 3-25. Days to Deploy by Air Report

```
tripr-AS-modify              Airlift/Sealift Model
                                Input Panel

                     Modify Aircraft Characeristics Panel

General Information:
            For each type aircraft, you will be presented with a screen
identical to this one.  You would modify or verify the characteristics shown.
To modify, enter the new number;  to verify simply ENTER for that item.

                                AIRCRAFT:  C5-B

     Daily UTE (hours/day)    10.5          One-way productivity factor 0.47

     Average Payload (ston)   83.6
                                            Block Speed (knots)      423.0
     Average Payload  (pax)   N/A

PF:   1/13 Help   2/14        3/15 Return   4/16        5/17         6/18
      7/19 Finished entering                10/22       11/23        12/24
```

Figure 3-26. Aircraft Input Data Modification Panel

d. These panels (Figures 3-26 and 3-27) are presented when the user desires to modify the characteristics of the air or sea assets (Option E).

```
tripr-AS-modify              Airlift Sealift Model
                           Lotus/dBase Input Panel

                     Modify Ship     Characeristics Panel

General Information:
            For each type ship,      you will be presented with a screen
identical to this one.  You would modify or verify the characteristics shown
To modify, enter the new number;  to verify simply ENTER for that item.

                              SHIP TYPE: NSS-BREAKBULK

     Daily UTE (hours/day)    10.5          One-way productivity factor 0.47

     Average Payload (ston)   83.6
                                            Block Speed (knots)      23.0
     Average Payload  (pax)   N/A

PF:   1/13 Help   2/14        3/15 Return   4/16        5/17         6/18
      7/19 Finished entering                10/22       11/23        12/24
```

Figure 3-27. Ship Input Data Modification Panel

```
tripr-mover-info                    MOVER
                    Model  Background and Information        Pg 1 of 2

              The MOVER model is an automated system for determining Cargo
Offload and Lighterage Discharge Systems (COLDS) requirements to support a
specified cargo discharge scenario.  It models Logistics-Over-The-Shore
scenarios with input of cargo arrival characteristics and Objective Area (OA)
constraints.  The requirements are determined for each day
                                                        of a selected scenario.

              MOVER separates parameters for any cargo discharge scenario into
the areas of cargo discharge schedule, equipment/cargo productivities and equip-
ment/cargo operational assignments.  You can select a data set from a number of
standard scenarios, enter a new set of data, or modify an existing set.

              The MOVER model should take less than 30 minutes for any given
scenario.  After the model runs, the user may select from a number of standard
report formats to depict the output, or may get a complete tabular output of the
run.

              Press ENTER to run MOVER or PF1 to get more information.

PF:   1/13 More Info              3/15 Return       5/17        6/18
      7/19                                          11/23       12/24
```

Figure 3-28. MOVER Model Information 1

```
tripr-mover-info2                   MOVER
                    Model Background and Information        Pg 2 of 2

              If you choose to modify a data set, you may do so by making
the appropriate selections on the main model menu.  Should you desire to
create a new set of data, make the appropriate selection and input your data
as shown on each individual data entry screen.

              The cargo discharge parameters are based on ship/cargo loadouts,
ship arrival times, and cargo required delivery dates (RDDs).  The discharge
profile is determined independent of the equipment available or other OA con-
straints.  The system's function is based on meeting these cargo RDDs.

              The equipment/cargo parameters are based on seastate conditions,
available equipment types, beach gradient and other OA constraints.  The user
can input actual or notional scenario parameters.

              The separation of cargo and equipment scenario parameters enables
the user to hold certain parameters constant while varying others.  Sensitivity
and decision analyses are easily run by this method.

PF:   1/13                        3/15 Return       5/17        6/18
      7/19                                          11/23       12/24
```

Figure 3-29. MOVER Model Information 2

3-8. PORT MODEL MOVER. Figures 3-28 and 3-29 are the information panels for use of the MOVER Model. They explain the purpose of the model and its procedures and functions.

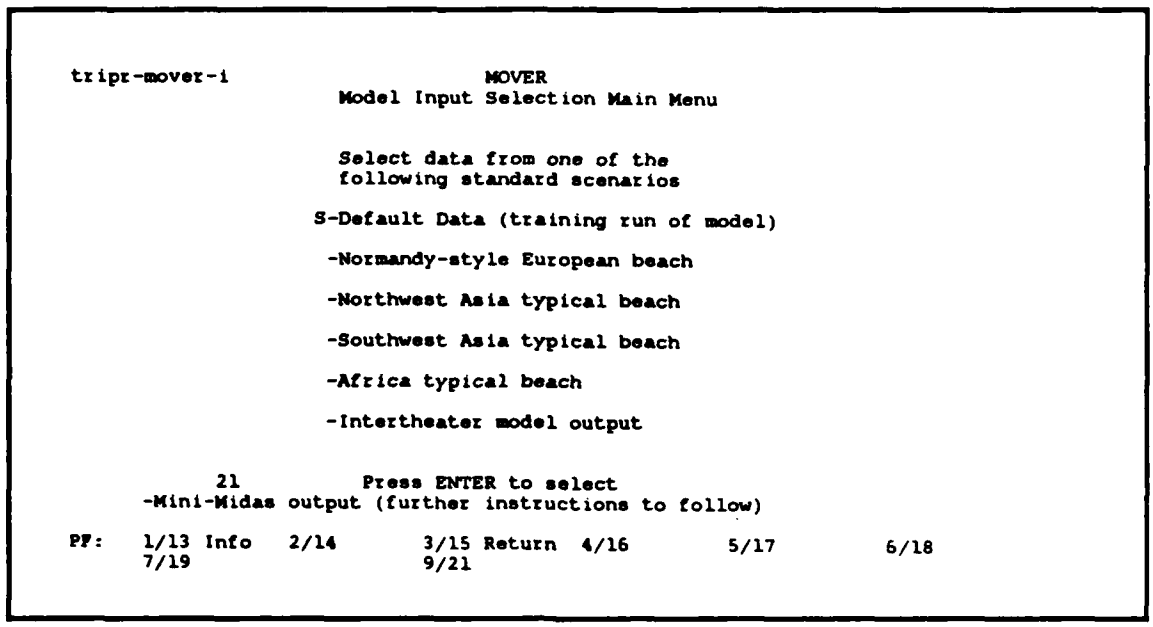


Figure 3-30. MOVER Model Input Menu 1

a. MOVER Model Input Selection Information

(1) For this model (Figure 3-30), a set of input parameters must be available which will depict the various beaches shown on the initial input screen. Factors such as beach gradient and weather conditions must be a part of each of the input sets for each beach type. The user must only choose a beach type in order to cause the selected inputs to feed the MOVER Model.

(2) Additionally, the model will allow the user to designate the outputs of a intertheater model to be used as inputs for the MOVER Model. For example, the Mini-MIDAS intertheater model could, as part of its output, indicate that a LOTS operation in Europe caused a unit to miss its RDD. The action officer could then enter the MOVER Model and designate that the Mini-MIDAS output from that run be used in MOVER to more closely analyze the LOTS operation. The specific inputs transferred would include the port constraints, the tonnages and sizes of the units/ships arriving, and the types and characteristics of the LOTS equipment to be modeled. The MOVER Model would output the requirements needed at the beach and in the water to support that offload and discharge situation. Several additional screens, not yet developed, would be needed to exercise this option.

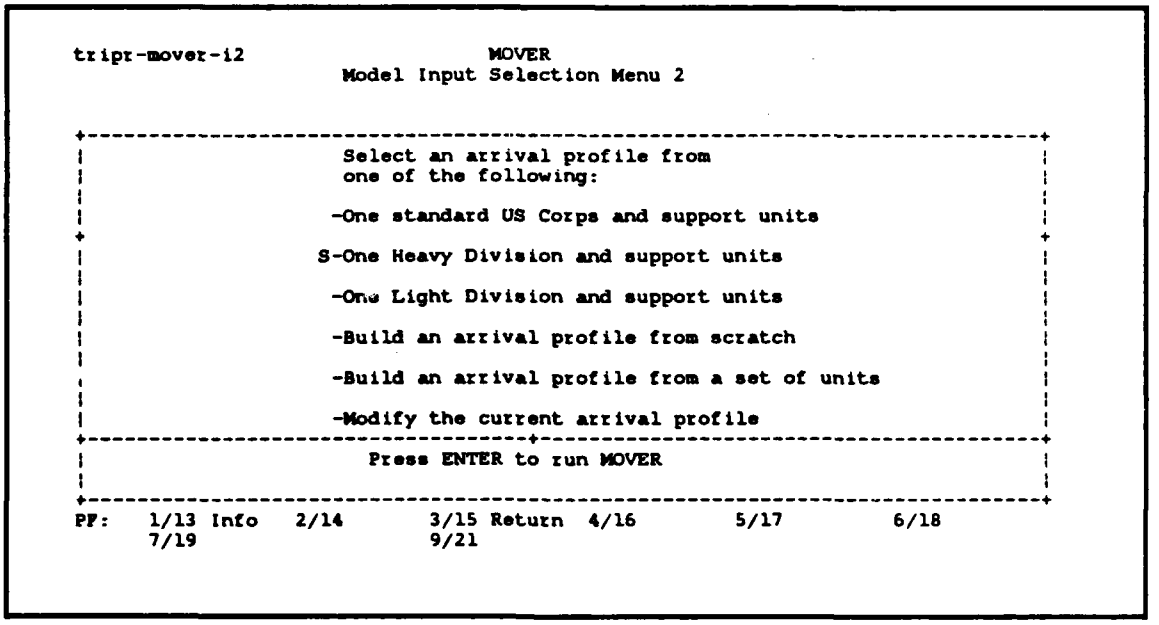


Figure 3-31. MOVER Model Input Menu 2

b. MOVER Model Input Information 2

(1) If the action officer has chosen to use the output of a intertheater model as input to this model, the only applicable choice on this menu would be to modify the current arrival profile. The output of the intertheater model would contain an arrival profile which may be modified.

(2) An arrival profile is a list, by day of arrival, of the ships arriving, a description of the configuration of their cargo (breakbulk, RORO, containers), the type of cargo (unit equipment, ammunition, etc.) and the amount of each type in standard terms (STON, MTON, SQFT, CUBE).

(3) From this screen, the action officer has the option of choosing several standard "type" units or may construct an arrival profile of her/his own. She/he may choose to build the profile from a set of other units (i.e., standard "type" battalions or brigades) or may wish to construct the profile by specifying each element required as shown above. She/he may also modify previously entered or standard profile elements.

```
tripr-mover-o                    MOVER
                  Model Output Selection Menu    Scenario: HvyDiv
                                                 Action  : LTC O. Smith
                                                 Port    : Default


                        View the input data-
                                A-Arrival Profile data for port
                                B-Arrival Profile Daily totals

                        Output Data-
                                C-Discharge Profile
                                D-COLDS System Requirements Report
                                E-Maximum Requirements by Equipment & Day
                                F-Manning Requirements

                    (IF ACTUAL DATA WERE USED, REPORTS WOULD BE CLASSIFIED)


PF:   1/13      2/14      3/15 Return  4/16      5/17      6/18
      7/19      8/20      9/21         10/22     11/23     12/24
```

Figure 3-32. MOVER Output Report Selection Menu

c. **Output Reports.** Figure 3-32 depicts the various model output reports available. The output reports are shown in Figures 3-33 through 3-38.

```
tripr-mover-disch                    MOVER
                          DISCHARGE PROFILE REPORT    Scenario: HvyDiv
                                                      Action  : LTC O. Smith
                                                      Port    : Default
                      DAY
CARGO CATEGORY          21          22          23          24          25    . . .
-------------------------------------------------------------------------------
RO VEH #
RO VEH
RO UE
SS LO VEH #
SS LO VEH
SS LO UE
SS LO PAL SUPP
SS LO PAL AMMO
SS LO CONT SUPP
SS LO CONT AMMO
SS LO CONT WT
NSS LO VEH #
.
.
.

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22       11/23          12/24 Left
```

Figure 3-33. Discharge Profile Report

```
tripr-mover-apd                      MOVER
                          ARRIVAL PROFILE DAILY TOTALS  Scenario: HvyDiv
                                                        Action  : LTC O. Smith
                                                        Port    : Default

DAY     NO OF VEHs   TOTAL VEH   NON CONT   PALLET    NO OF    CONT      TOTAL
                      WEIGHT      WEIGHT     WEIGHT    CONTs    WEIGHT    WEIGHT
---     ----------   ---------   --------   ------    -----    ------    ------
1
2
3
4
5
6
7
8
9
10
.
.
.

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21 Bar     10/22       11/23          12/24 Left
```

Figure 3-34. Arrival Profile Daily Totals Report

```
tripr-mover-arv                    MOVER
                          ARRIVAL DATA FOR PORT      Scenario: HvyDiv
                                                     Action  : LTC O. Smith
                                                     Port    : Default

SEQ|BERT    |SHIP| CGO TYPE  |  SHIP TYPE  |#OF |TOT VEH|NONCONT|PALLET |#OF
NO.|ARR NO.| NO.|            |             |VEHs|   WT   |WEIGHT |WEIGHT |CONTs
---|-------|----|------------|-------------|----|--------|-------|-------|-----
1      6     30750 AMMUNITION BREAKBULK    0      0       0      11140     0
2      6     22542 AMMUNITION BREAKBULK    0      0       0       1208     0
7     20     30008 CSS-MEDICA CONT-NSS40   0      0       0          0    40
18    23     41585 CS-ENGINEE RO/RO        382    2072    1323     362     0
.                              .
.                              .
.                              .
.                              .

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22       11/23          12/24 Left
```

Figure 3-35. Arrival Data for Port

```
tripr-mover-coldsrqmts             MOVER
                          SYSTEM REQUIREMENTS REPORT  Scenario: HvyDiv
                                                      Action  : LTC O. Smith
                                                      Port    : Default
EQUIPMENT          DAY
     CATEGORY          21          22          23          24          25    . . .
-------------------------------------------------------------------------------
RRDP
TACS
TCDP
CSP+1
CSP+3
LCU-1446
LCU-1610
LACV-30
LARC-LX
LCM-8
NEW-ITEM
.
.
.
.

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22       11/23          12/24 Left
```

Figure 3-36. System Requirements Report

```
tripr-mover-maxrqmt                MOVER
                        MAXIMUM REQUIREMENTS REPORT  Scenario: HvyDiv
                                                     Action  : LTC O. Smith
                                                     Port    : Default
                          MAXIMUM                      DAY(S) ON WHICH
EQUIPMENT NAME          REQUIREMENTS                MAXIMUM REQUIREMENT OCCURS
--------------          ------------                --------------------------
RO VEH #
RO VEH
RO UE
SS LO VEH #
SS LO VEH
SS LO UE
SS LO PAL SUPP
SS LO PAL AMMO
SS LO CONT SUPP
SS LO CONT AMMO
SS LO CONT WT
NSS LO VEH #
.
.
.

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22       11/23          12/24 Left
```

Figure 3-37. Maximum Requirements Report

```
tripr-mover-mnpwr                  MOVER
                        MANPOWER REQUIREMENTS REPORT  Scenario: HvyDiv
                                                      Action  : LTC O. Smith
                                                      Port    : Default

UNIT TYPE NAME              DAY ON WHICH MAXIMUM          NUMBER OF
                             REQUIREMENT OCCURS        UNITS REQUIRED
---------------------       --------------------      --------------

Terminal Service Company
         Breakbulk                    13                      4
         Container                    12                      3

Terminal Transfer Company             13                      6

Truck Companies
         Light Medium                 15                      2
         Medium                       15                      2


PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22       11/23          12/24 Left
```

Figure 3-38. Manpower Requirements Report

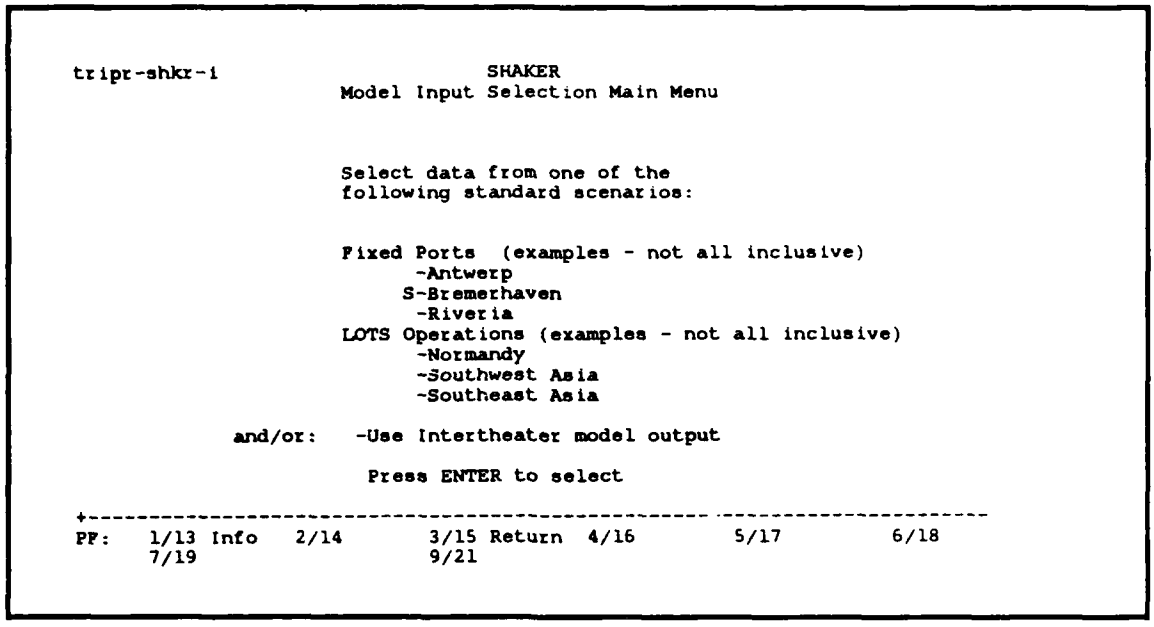


Figure 3-39. SHAKER Model Input Menu 1

3-9. PORT MODEL SHAKER. The SHAKER Model is an automated model which describes Cargo Offload and Lighterage Discharge System (COLDS) capabilities to support a specified cargo discharge scenario. It models logistics over the shore (LOTS) and/or fixed port scenarios with the input of an arrival profile, cargo, vessel and unit data. While the MOVER Model will tell the user the requirements needed to meet a specified arrival profile, SHAKER will tell the user how to meet RDD.

a. The MOVER Model is a relatively simple assignment problem which calculates and assigns discharge profiles. SHAKER, on the other hand, optimizes the use of the assets onhand in order to best meet RDDs and a specified discharge profile.

b. As with MOVER, the user is given the option to choose from a set of standard scenarios, or create/modify scenarios for specific problems.

c. Figures 3-39 and 3-40 show the model input selections. For each port in the free world which is used for intertheater transport, a set of capability and capacity data will be accessible using this menu. By selecting, for example, Bremerhaven, the system will input all of the port's shore discharge equipment that is currently available into the SHAKER Model.

d. The action officer also has the option of using the output of an intertheater model as input to this port model. The user would select the port of interest, and then the selection corresponding to the intertheater model. The system would then prompt her/him for the version of the intertheater output needed, and then would run the model. For example, the intertheater model could, as part of its output, identify a port that caused a unit to miss its RDD for an unknown reason. The action officer could then enter SHAKER, and designate the intertheater output to be used in SHAKER to more closely analyze the port's operations. The SHAKER Model output would specifically identify the shortfall, if one existed, at the port in question.

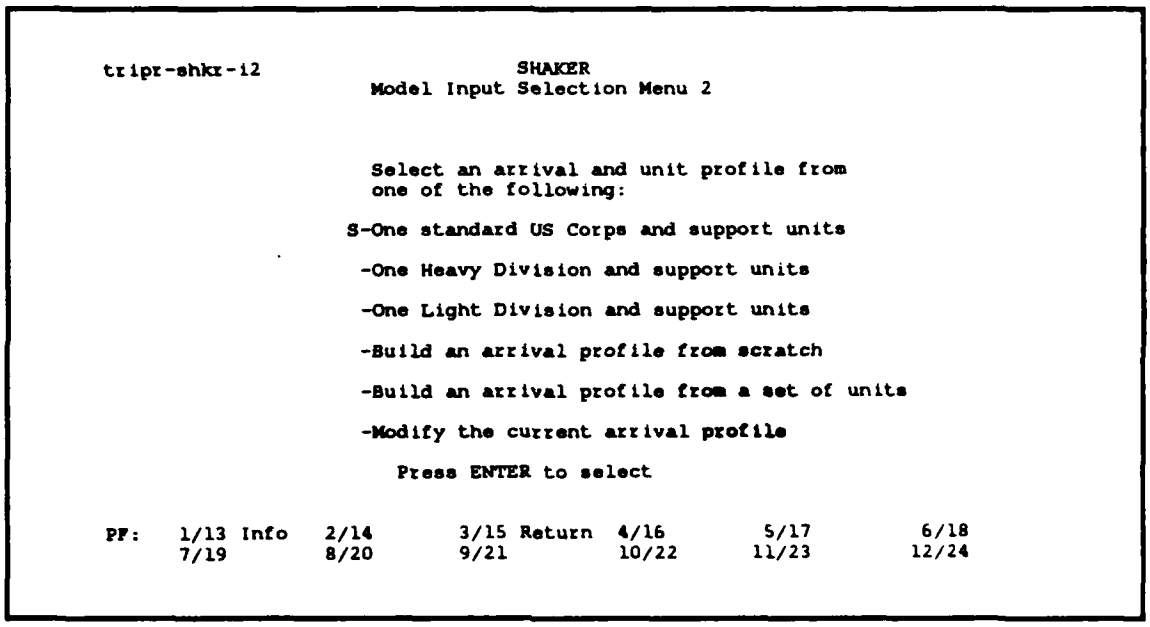


Figure 3-40. SHAKER Model Input Menu 2

e. If the action officer has chosen to use the output of a intertheater model as input to this model, the only applicable choice on this menu would be to modify the current arrival profile. The output of the intertheater model would contain an arrival profile which may be modified.

f. An arrival profile is a list, by day of arrival, all of the ships arriving, a description of the configuration of their cargo (breakbulk, RO/RO, containers), the type of cargo (unit equipment, ammunition, etc.) and the amount of each type in standard terms (STON, MTON, SQFT, CUBE).

g. From this panel, the action officer has the option of choosing several standard "type" units or may construct an arrival profile of her/his own. She/he may choose to build the profile from a set of other units (i.e., standard "type" battalions or brigades) or may wish to construct the profile by specifying each element required as shown above. She/he may also modify previously entered or standard profile elements.

```
tripr-shak-o                    SHAKER
                  Model Output/Report Generator Scenario: U.S.Corps
                                                 Action  : LTC O. Smith
                                                 Port    : Bremerhaven

                  Utilization Reports-
                           A - Fixed Port by Berth
                             - LOTS Site by Ship Discharge Anchorage
                             - LOTS Site by Shore Discharge Point
                             - Intransit Cargo Area by Cargo Type
                             - Cargo Lift/Handling Equipment
                             - Cargo Transport Equipment
                             - Manpower
                  Activity Reports-
                           B - Vessel Activity
                           C - Berth Activity
                  Status/Summary Reports-
                           D - Vessel Activity Summary by Ship Type
                           E - Berth Activity Summary by Berth
                           F - Port Daily Vessel Status
                           G - Port Daily Berth Status
              (IF ACTUAL DATA WERE USED REPORTS WOULD BE CLASSIFIED)

PF:   1/13      2/14      3/15 Return  4/16      5/17      6/18
      7/19      8/20      9/21         10/22     11/23     12/24
```

Figure 3-41. SHAKER Model Output Report Selection Menu

h. This menu (Figure 3-41) allows the user to choose an output report for the SHAKER Model. The output reports are shown as Figures 3-42 through 3-47.

```
tripr-shkr-pusr                    SHAKER
                  FIXED PORT UTILIZATION SUMMARY REPORT Scenario: U.S.Corps
                        BERTH TYPE : BREAKBULK          Action  : LTC O. Smith
                                                        Port    : Bremerhaven
     BERTH NO. 1        BERTH NO. 2        BERTH NO. 3          % UTILIZATION
DAY    %UTILIZATION       %UTILIZATION       %UTILIZATION      TOTAL   AVERAGE
     HRS DAILY* CUM *   HRS DAILY* CUM*    HRS DAILY* CUM *    HOURS   DAILY  CUM
-------------------------------------------------------------------------------
1
2
3
4
5
6
7
8
9
10
11
.
.
.

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22      11/23          12/24 Left
```

Figure 3-42. Port Utilization Summary Report

```
tripr-shkr-var                     SHAKER
                                VESSEL ACTIVITY REPORT      Scenario: U.S.Corps
                                                            Action  : LTC O. Smith
                                                            Port    : Bremerhaven
NO.      VESSEL      SHIP     ARRIVAL     BERTHING     DISCHARGE    DISCHARGE   DPRT
         NUMBER      TYPE       TIME      TIME   LOC   START  END    STONS      TIME
-------------------------------------------------------------------------------
  1
  2
  3
  4
  5
  6
  7
  8
  9
 10
 11
 12
  .
  .
  .

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22      11/23          12/24 Left
```

Figure 3-43. Vessel Activity Report

```
tripr-shkr-bar                         SHAKER                    Scenario: U.S.Corps
                                BERTH ACTIVITY REPORT            Action   : LTC O. Smith
                                                                 Port     : Bremerhaven
BERTH DATA              OCCUPATION DATA             DISCHARGE DATA      CGO DATA
TYPE      ID.   VSL NO  SHIP TYPE    START END      START      END   TYPE   PCS  STONS
-----------     ---------------------------------   --------------   ---------------
BB        1                                                          1.
BB        1
BB        1                                                          2.
BB        1
BB        1                                                          3.
BB        1
BB        1
BB        1
BB        1
BB        1
     .
     .
     .

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16       5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22     11/23          12/24 Left
```

Figure 3-44. Berth Activity Report

```
tripr-shkr-vas                         SHAKER                    Scenario: U.S.Corps
                          VESSEL ACTIVITY SUMMARY REPORT         Action   : LTC O. Smith
                                                                 Port     : Bremerhaven
SHIP TYPE     NO. OF        AWAITING BERTH            DISCHARGE OPERATIONS   PLANNING
              VESSELS   AVG NO| MAX NO| MAX TIME      MAX |AVG |MIN |MAX      FACTOR
                              |       |                NO.|TIME|TIME|TIME
---------     -------   ------------------------      ------------------     --------
BREAKBULK
CONT NSS20
CONT NSS35
CONT NSS40
CONT SS20
CONT SS35
CONT SS40
CONT BB20
CONT BB35
CONT BB40
CONT RORO
RORO
.
.
.
PF:   1/13 Down   2/14 Bar   3/15 Return  4/16       5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22     11/23          12/24 Left
```

Figure 3-45. Vessel Activity Summary Report

```
tripr-shkr-dvs                    SHAKER                    Scenario: U.S.Corps
                    DAILY VESSEL STATUS REPORT              Action  : LTC O. Smith
                                                            Port    : Bremerhaven

      AWAITING                  AWAIT   DISCHG    DISCHG     DISCHARGE   VESSEL
DAY   BERTH     BERTHED         DISCHG  STARTED   UNDERWAY   COMPLETED   DEPARTED
---   --------  -------         ------  --------  --------   ---------   --------
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11
12
 .
 .
 .

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22      11/23          12/24 Left
```

Figure 3-46. Daily Vessel Status Report

```
tripr-shkr-dbs                    SHAKER                    Scenario: U.S.Corps
                    DAILY BERTH STATUS REPORT               Action  : LTC O. Smith
                                                            Port    : Bremerhaven
          BERTH TYPE:
                                          -------DISCHARGE OPERATIONS--
          BERTHS        AWAITING          START                COMPLETE   BERTH
DAY       AVAIL  OCCUP  DISCHARGE         THIS DAY   ONGOING   THIS DAY   CLEARED
----      -------------  ----------        --------   -------   ---------  -------
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11
 .
 .
 .

PF:   1/13 Down   2/14 Bar   3/15 Return  4/16        5 Other graph  6  Right
      7/19 Up     8/20 Pie   9/21         10/22      11/23          12/24 Left
```

Figure 3-47. Daily Berth Status Report

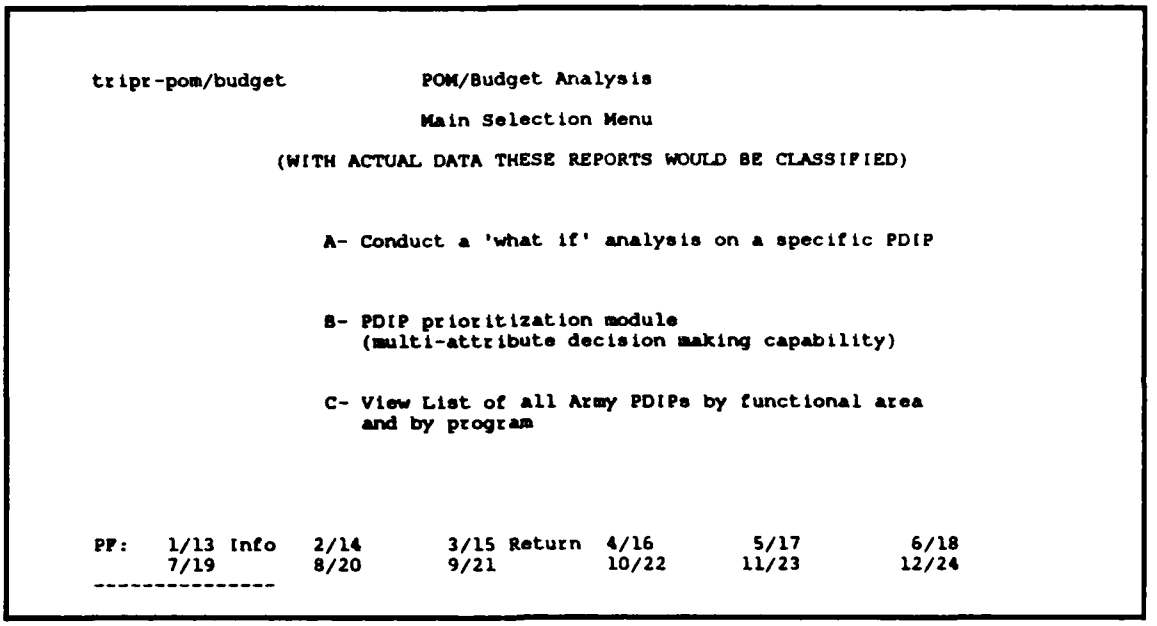


Figure 3-48. POM/Budget Option Main Selection Menu

3-10. POM/BUDGET ANALYSIS OPTION. Figure 3-48 is presented when the user selects "POM/Budget Analysis" from the main Strategic Mobility menu. The functions available are depicted on subsequent panels (Figures 3-49 through 3-54).

```
tripr-pom/budget          POM/Budget Analysis

                        PDIP What-if Analysis

                          Explanation Screen

            The user will have the option to change the funding (in dollars
or in terms of a percentage) for one or more PDIPs by specifying one or more
of the following parameters:

            -Fiscal Year
            -Major Command code and/or Staff Proponent
            -Functional Area Code
            -Appropriation Code (i.e., OMA, RTDE, etc)
            -A set of PDIP numbers or names

            After commanding the system to 'calculate', the system will caus
the change(s) specified to 'ripple' throughout as many PDIPs as the change
applies to.  No actual change to the data base would take place.
This method will show what effect the proposed change would have on the overall
program. Output will show the overall programing funding change due to the
PDIP changes.  The capability to save the set of what-if changes to a user file
will exist.
PF:   1/13 Help   2/14      3/15 Return  4/16      5/17      6/18
      7/19        8/20      9/21         10/22     11/23     12/24
```

Figure 3-49. PDIP "What-if" Analysis

a. Figure 3-49 is presented when Option A is chosen from the POM/Budget Analysis menu (Figure 3-48).

b. Figure 3-50 is presented when Option B of the POM/Budget Analysis menu (Figure 3-48) is chosen.

c. Figure 3-51 appears when Option C is chosen from the POM/Budget Analysis menu (Figure 3-48). The user must then enter the appropriate search criteria for the PDIPs desired. Help panels will be accessible to assist in entering the codes.

```
tripr-pdip-mau                PDIP Management

                  Multi-Attribute Decision Utility Tool
                              Information
1.  This decision aide is designed to allow a decision maker or group of
decision makers to prioritize or rank order PDIPs according to certain
criteria specified by the group.  It takes input in the form of 'qualitatitive
judgements' and quantifies them.  PDIPs will be compared to each other for each
criterion by each participant and then given a score.  As an alternative, users
can 'score' PDIPs in each criterion from 0 to 100.

2.  Sample criterion might include how well a PDIP:
                Decreased missed RDDs
                Decreased idle resources
                Increased utilization of assets
                Decreased queue lengths
                Minimized cost for its respective benefits
                Decreased lift requirements
                Helped to 'balance' the system

3.  Output would show which PDIP was considered overall 'best' in meeting the
various criteria, and why it was the 'best'.  A prioritized list is generated.

PF:   1/13 Help   2/14       3/15 Return  4/16       5/17        6/18
      7/19        8/20       9/21         10/22      11/23       12/24
```

Figure 3-50. PDIP Rank Ordering Tool

```
tripr-pom/budget-1          POM/Budget Analysis

                        View PDIPs based on criteria

PDIPs may be selected either by functional area, by program, or both.

        Enter the functional area code number:  IM
        (2 space alphabetic code)
        (Enter 'U' for unfunded PDIPs or 'F' for funded)

        And/or one or both of the following:

        Enter the Staff Proponent:
        Enter the Major Command Code:

        OR

        Enter a specific PDIP number:        or name:


                              Press ENTER to continue

PF:   1/13 Help   2/14       3/15 Return  4/16       5/17        6/18
      7/19 Functional Area Code definitions 10/22 Program Code definitions
```

Figure 3-51. View PDIP Input Panel

```
tripr-pom/bud-o          Strategic Mobility Module
                         Management Information System

                                                    Criteria for search was-
                         Criteria Specified PDIP List  Functional Area: IM
                                                       Major Command:

  PDIP Title          PDIP Number    Staff Proponent    Fcn Codes    Program Codes
  ----------          -----------    ---------------    ---------    -------------
  ISSSC Mission           5S7Z             DAIM             IM          11,39,95
        .                                                                  .
        .                                                                  .
        .                                                                  .

 If you desire to see the dictionary page for a specific PDIP, move the cursor
to that PDIP and press enter.
 For purposes of the prototype, this option is not available.  Press enter to
view the PDIP dictionary page for PDIP 5S7Z, simulating having moved the
cursor to the first PDIP on the list above.

                          Press ENTER to continue

PF:   1/13 Help   2/14        3/15 Return  4/16        5/17         6/18
        7/19        8/20        9/21         10/22       11/23        12/24
```

Figure 3-52. Criteria-Specified PDIP List

```
tripr-PDIP-DIC1                PDIP Management
                    Individual PDIP Dictionary Report
                          (COULD BE CLASSIFIED)
                              UNCLASSIFIED
AS OF 18FEB87  PROBE CONTROL DICTIONARY REPORT PRES BUDGET        Page 1 of 2

PDIP  CDIP:  TITLE:                              PANEL/LEV/NAME:
5372         ISSSC MISSION                         IM    06 MANAGING INFORMATION

I RC     PSP   CMD   BCE   M   $/P   F/U   ->FY85(-   ->FY86(-   ->FY87(-   ->FY88
- --     ---   ---   ---   -   ---   ---   --------   --------   --------   ------
0 CUDH    11   A3                  P     F          0          0       -354     -354
0 CUDH    39   A3                  P     F          0        736        354      354
0 CUDH    95   A3                  P     F       1109          3          0        3
                                                --------   --------   --------   ------
          CUDH TOTAL.....                        1109        739          0        3
                                                ++++++++   ++++++++   ++++++++   ++++++

REMARKS:PF9


PF:   1/13 Down   2/14        3/15 Return  4/16        5/17         6/18 Right
        7/19 Up     8/20        9/21 PDIP Remarks data                10/24 Left
```

Figure 3-53. Individual PDIP Dictionary Report Left Scroll

(1) As a result of entering the search criteria, the list of PDIPs is generated (Figure 3-52). The user may view one of these PDIPs in detail by moving the cursor and pressing ENTER.

```
tripr-PDIP-DIC2                PDIP Management
                      Individual PDIP Dictionary Report
                           (COULD BE CLASSIFIED)
                             UNCLASSIFIED
AS OF 18FEB87   PDIP 537Z

RANKING SEQ NUMBER:     READINESS INDICATOR:  STAFF PROPONENET:
        1063                     0                    DAIM

->FY89<-   ->FY90<-   ->FY92<-            UIC
--------   --------   --------           -------

  -354       -354       -354
   354        354        354
--------   --------   --------           -------
     0          0          0
++++++++   ++++++++   ++++++++           +++++++

REMARKS:PF9


PF:    1/13 Down   2/14       3/15          4/16        5/17        6/18 Right
       7/19 Up     8/20       9/21 PDIP Remarks data              10/24 Left
```

Figure 3-54. Individual PDIP Dictionary Report Right Scroll

```
tripr-PDIP-RMKS                PDIP Management
                      Individual PDIP Dictionary Report
                           (COULD BE CLASSIFIED)
                             UNCLASSIFIED


PDIP     AS OF
537Z     18FEB87

(U)  PROVIDES FUNDING FOR PERSONNEL AND DAY-TO-DAY OPERATING COSTS FOR SOF
TWARE DEVELOPMENT, MODIFICATION AND MAINTENANCE OF: LOCISTICS, PERSONNEL,
FORCE ACCOUNTING & FINANCIAL ARMY MULTI-COMMAND MANAGEMENT INFORMATION
SYSTEMS.  INCLUDES OPERATION & MAINTENANCE OF USAISEC JCOMPUTER FACILITIES
(TEST BED) AT FT LEE AND FALLS CHURCH VIRGINIA

STAFF    RANK   NAME          ROOM     OFFICE       PHONE
-----    ----   ----          ----     ------       -----
PAED     LTC    FARMELO       3C747    DACS-DPA     2274686
COA      MS     PARISE        3B666    DACA-OSP     5551215
STFF     MR     LAKOWSKI      1D679    DAIM-PAB     5551212


                          PF3 Return
```

Figure 3-55. Individual PDIP Dictionary Remarks

(2) Figures 3-53 and 3-54 illustrate a PDIP dictionary page and the ability to scroll left and right to view all the data.

(3) Figure 3-55 shows the PDIP remarks data that will be accessible for any specific PDIP.

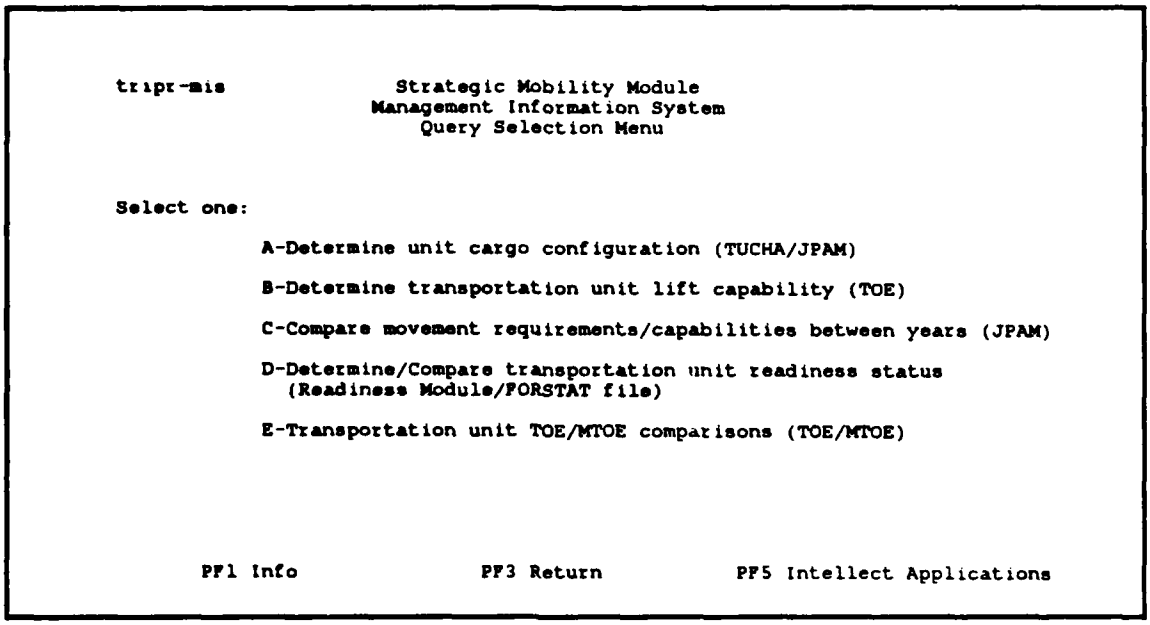


Figure 3-56. Management Information System Main Menu

3-11. MANAGEMENT INFORMATION SYSTEM OPTION

a. This panel (Figure 3-56) depicts the options available which are preprogramed queries of the data base. If the user desires to query a data file in a free-form manner (in plain English), she/he would press function key 5 for intellect applications.

b. For options A, B, D, and E, the user is prompted for information concerning the unit of interest. The unit may be an actual unit or may be one of the standard "type" units. For an actual unit, the user will enter the unit's name (for example, the 20th Chemical Det), or the UIC. In the case of a notional or "type" unit, the user enters the SRC or the type unit name (for example, "Chemical Detachment"). The system has the capability to interpret the type unit name and will ask further questions if it has trouble identifying the unit in question.

c. For option C, the user has the option of choosing FY comparisons for units, theaters or total global movement requirements. If a unit comparison is chosen, the same method of identifying the unit as explained above is used. Should the user choose one of the other options, she/he is prompted for additional information (such as which theater to use).

d. As with other system outputs, the user may choose to have the output displayed graphically.

```
                    Strategic Mobility Module
                    Management Information System

                    Determine Unit Cargo Configuration

Enter the Unit Identification Code (UIC) for an actual unit:

                              or

Enter the Unit Designation for an actual unit:     99th Ord Bn
(example: 87th Armor Bn)

                              or

Enter the Standard Requirements Code (SRC) for a notional unit:

                              or

Enter the Type Name of a notional unit (example: Inf Bde):

                    Press ENTER to continue

                          PF3 Return
```

Figure 3-57. Cargo Configuration Input Panel

e. Figure 3-57 is the initial input panel for option A to determine unit cargo configurations.

```
                    Strategic Mobility Module
                    Management Information System

                    Determine Unit Cargo Configuration

  UIC        SRC          Unit Name          Unit Type Name          ←Unit ID
                                                                      Data
WQQNDS     A7848M2X   99th Ordnance Bn    Ordnance Battalion

                                          Cargo Quantities - STON
Number     Accompanying  Accompanying                          Non-Air
Passengers Supply-STON   Ammo-STON     Outsize  Oversize  Bulk  Transportable
    728        350           20          5        15      220        0

                          PF3 Return
```

Figure 3-58. Cargo Configuration Report

f. After conducting the data base query, the output is presented as indicated in Figure 3-58.

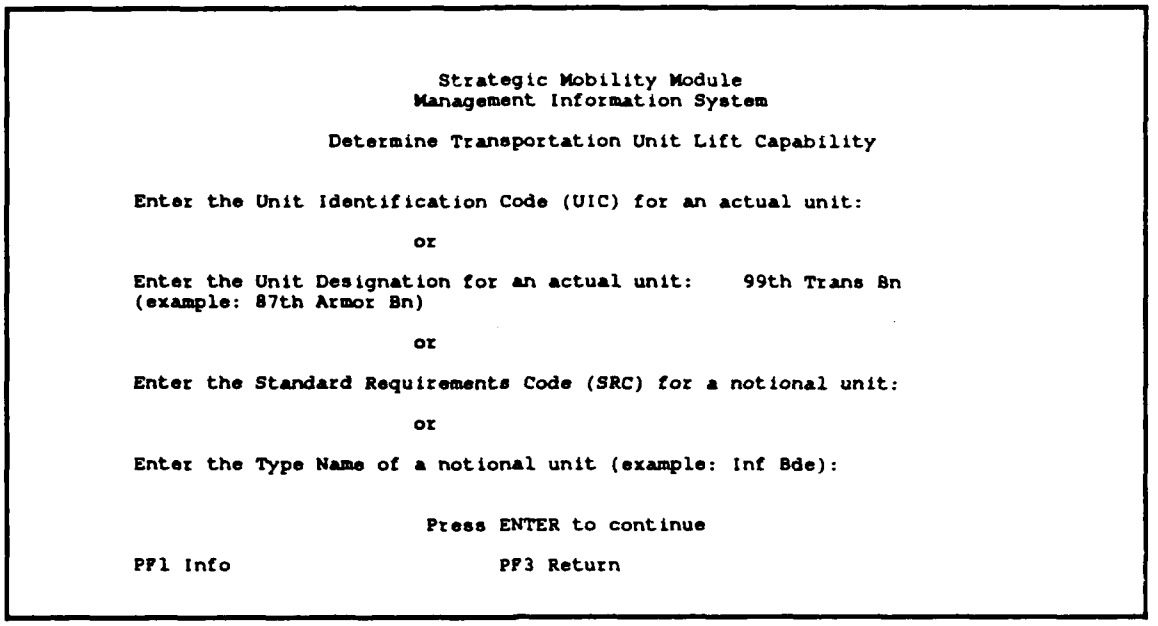
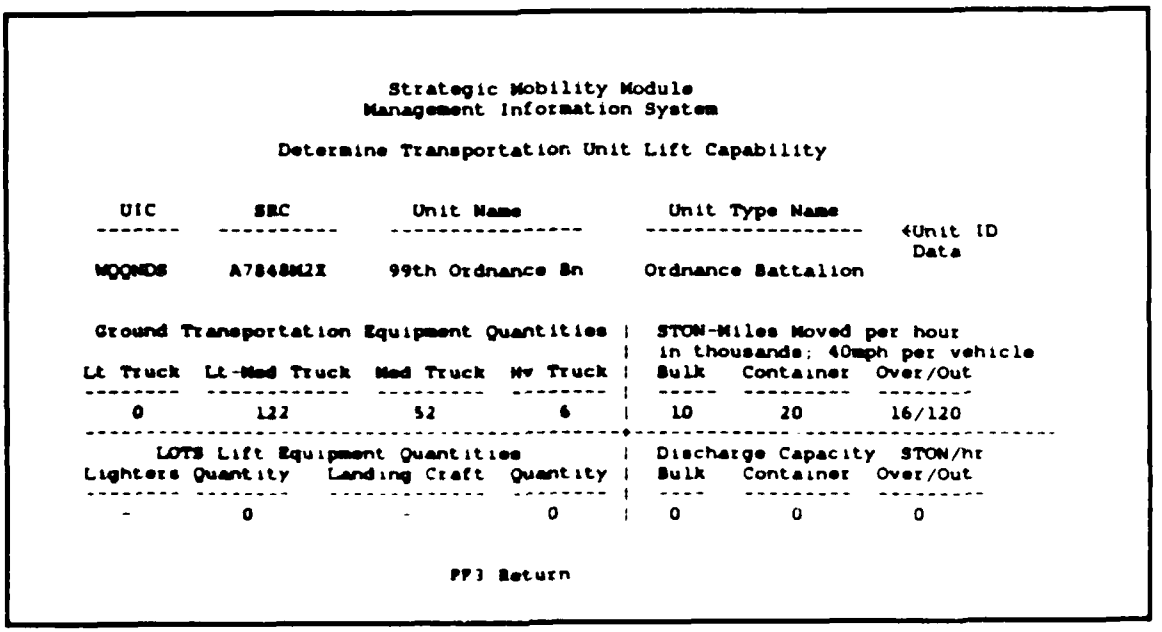


Figure 3-59. Unit Lift Capability Input Panel

g. Determine Transportation Unit Lift Capability (Option B)

(1) This option (Figure 3-59) allows the user to determine the lift capacity of a specified transportation unit. The unit may be a standard "type" unit, or may be an actual unit. The system will have the capability to interpret information identifying the unit in question as entered by the user. For example, if the user enters "76th Transportation Truck Company" the system will interpret that entry the same as "76th Trans Co." Should several units fit the description interpreted by the system, or if the system does not understand the data, it will prompt the user to enter it in the correct form or in a manner it can understand.

(2) This option will interface as required with the Equipment Distribution Module and/or the Force Accounting System. Mathematical calculations may be required by the system in order to present the unit in the current form; these will be done internally. (For example, the system might receive the fact that 1 each 5-ton truck exists in the unit; it would then calculate that the unit can lift 200 ton-miles-per-hour.)



Strategic Mobility Module
Management Information System

Determine Transportation Unit Lift Capability

UIC	SEC	Unit Name	Unit Type Name	←Unit ID Data
WQQNDS	A7848MZZ	99th Ordnance Bn	Ordnance Battalion	

Ground Transportation Equipment Quantities				STON-Miles Moved per hour in thousands; 40mph per vehicle		
Lt Truck	Lt-Med Truck	Med Truck	Hv Truck	Bulk	Container	Over/Out
0	122	52	6	10	20	16/120

LOTS Lift Equipment Quantities				Discharge Capacity STON/hr		
Lighters	Quantity	Landing Craft	Quantity	Bulk	Container	Over/Out
-	0	-	0	0	0	0

PF3 Return

Figure 3-60. Unit Lift Capability Report

(3) Figure 3-60 depicts the outputs as a result of choosing Option B.

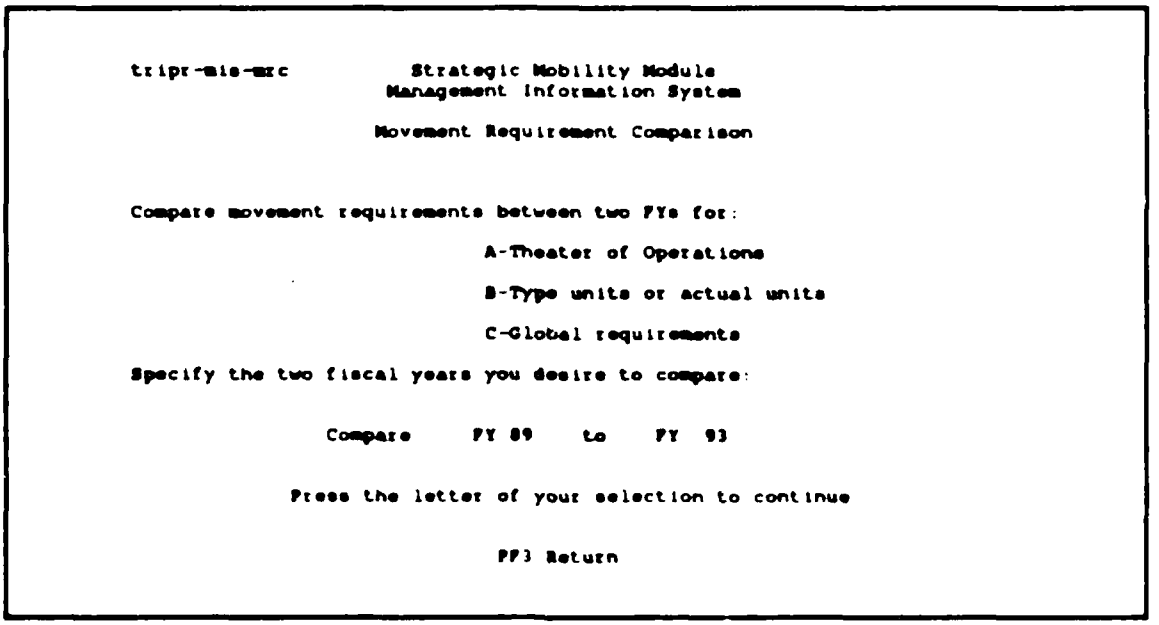


Figure 3-61. Movement Requirement Comparison Input Menu

h. The user is prompted for selections of the movement requirement comparison query (Figure 3-61).

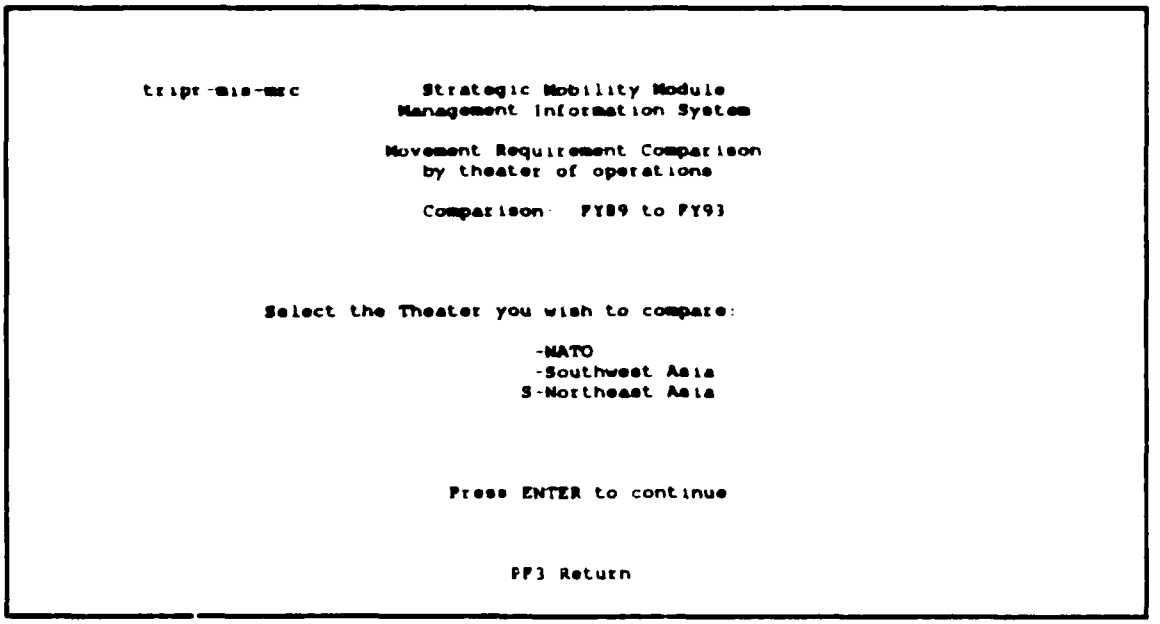


Figure 3-62. Requirement Comparison by Theater Input Menu

i. Upon selecting A on the Movement Requirement Comparison menu, the user is prompted to select a theater (Figure 3-62).

tripr-mis-mrc

Strategic Mobility Module
Management Information System

Movement Requirement Comparison
by theater of operations

Comparison: FY89 to FY93
Theater: Northeast Asia

Day after Mob	FY89 Bulk STON	FY89 Container STON	FY89 Over STON	FY89 Out STON	FY89 NAT STON	FY93 Bulk STON	FY93 Container STON	FY93 Over STON	FY93 Out STON	FY93 NAT STON
11	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
12			.							.
13			.							.
.			.							.
.										
TOTAL	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

PF: 1/13 Help 2/14 3/15 Return 4/16 5/17 6/18
7/19 Two pie charts of total requirements by FY 239/21 Other Graph

Figure 3-63. Requirement Comparison by Theater Report

j. Figure 3-63 is the output report format when a user runs the Movement Requirement Comparison query.

```
tripr-mis-mrc          Strategic Mobility Module
                     Management Information System

                  Movement Requirement Comparison
                     by type or actual units

                        Comparison:  FY89 to FY93

For the unit of interest,

Enter the Unit Identification Code (UIC) for an actual unit:
                              or
Enter the Unit Designation for an actual unit:    99th Trans Bn
(example: 87th Armor Bn)
                              or
Enter the Standard Requirements Code (SRC) for a notional unit:
                              or
Enter the Type Name of a notional unit (example: Inf Bde):

                             and

Enter the years to compare:  FY 89    to    FY  93

                          Press ENTER to continue
                               PF3 Return
```

Figure 3-64. Requirement Comparison by Unit Input Panel

k. As shown in Figure 3-64, the user must identify a unit for the comparison of movement requirements after selecting Option B from the menu in Figure 3-61.

```
tripr-mis-mrc          Strategic Mobility Module
                     Management Information System

                  Movement Requirement Comparison
                     by type or actual units

                        Comparison:  FY89 to FY93
                        Unit       :  99th Trans Bn

Day  |              FY89                          |              FY93
after| Bulk  Container  Over   Out   NAT          | Bulk  Container  Over   Out   NAT
Mob  | STON    STON     STON   STON  STON         | STON    STON     STON   STON  STON
-----+--------------------------------------------+--------------------------------------
 11  | XXXX    XXXX     XXXX   XXXX  XXXX         | XXXX    XXXX     XXXX   XXXX  XXXX
 12  |                   .                        |                                  .
 13  |                   .                        |                                  .
  .  |                   .                        |                                  .
  .  |
  .  |
     |
TOTAL| XXXX    XXXX     XXXX   XXXX  XXXX         | XXXX    XXXX     XXXX   XXXX  XXXX

PF:   1/13 Help   2/14        3/15 Return  4/16        5/17         6/18
      7/19 Two pie charts of total requirements by FY     9/21 Other Graph
```

Figure 3-65. Requirement Comparison by Unit Report

l. Figure 3-65 depicts the output panel for the Movement Requirement Comparison query.

tripr-mis-mrc

Strategic Mobility Module
Management Information System

Movement Requirement Comparison
Global Requirements

Comparison: FY89 to FY93

Day after Mob	FY89 Bulk STON	FY89 Container STON	FY89 Over STON	FY89 Out STON	FY89 NAT STON	FY93 Bulk STON	FY93 Container STON	FY93 Over STON	FY93 Out STON	FY93 NAT STON
11	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
12			.							.
13			.							.
.			.							.
.										
.										
TOTAL	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

PF: 1/13 Help 2/14 3/15 Return 4/16 5/17 6/18
7/19 Two pie charts of total requirements by FY 9/21 Other Graph

Figure 3-66. Global Requirement Comparison Report

m. Figure 3-66 is the resulting output panel when the user requests a global movement requirement comparison for two FYs (Option C in Figure 3-61).

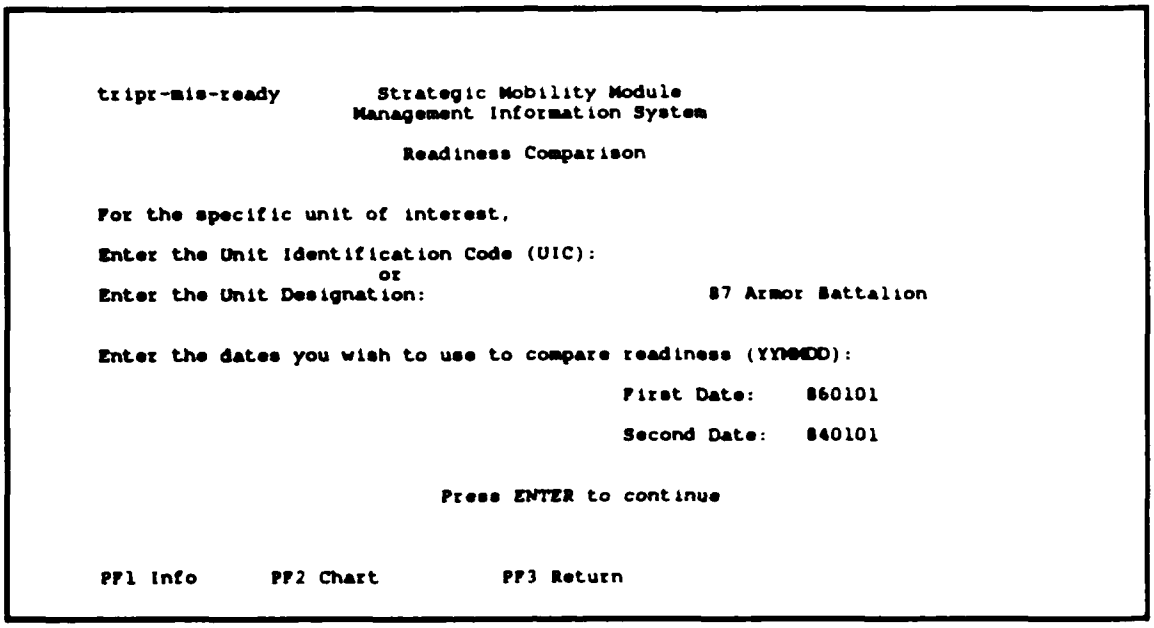


Figure 3-67. Readiness Comparison Input Panel

n. Figure 3-67 is the input panel for a readiness comparison (Option D, Figure 56, page 3-41). This option compares the readiness of a specified unit over time. The information the system needs to provide the data is the identification of the unit in question, either in the form of a UIC or a unit name. The system will interpret the unit name provided in a variety of ways. (For example, the system interprets 71 Ord Co the same way as 71st Ordnance Company.)

(1) The user is also prompted for two dates for comparison purposes. The system will search for the two Unit Status Reports (DA Form 2715) which exist prior to the date required for comparison. (For example, if you specify 860101, the system will search for the USR data which was reported just prior to that date, in this case 851215. If you specify the exact date of a USR, the system will provide that data.)

(2) The unit commander's narrative remarks are also available by pressing PF5. In addition, the option will be available to chart the selected comparison, by use of pie, bar and line charts.

(3) An explanation of reason codes is available in Appendix E, AR 220-1.

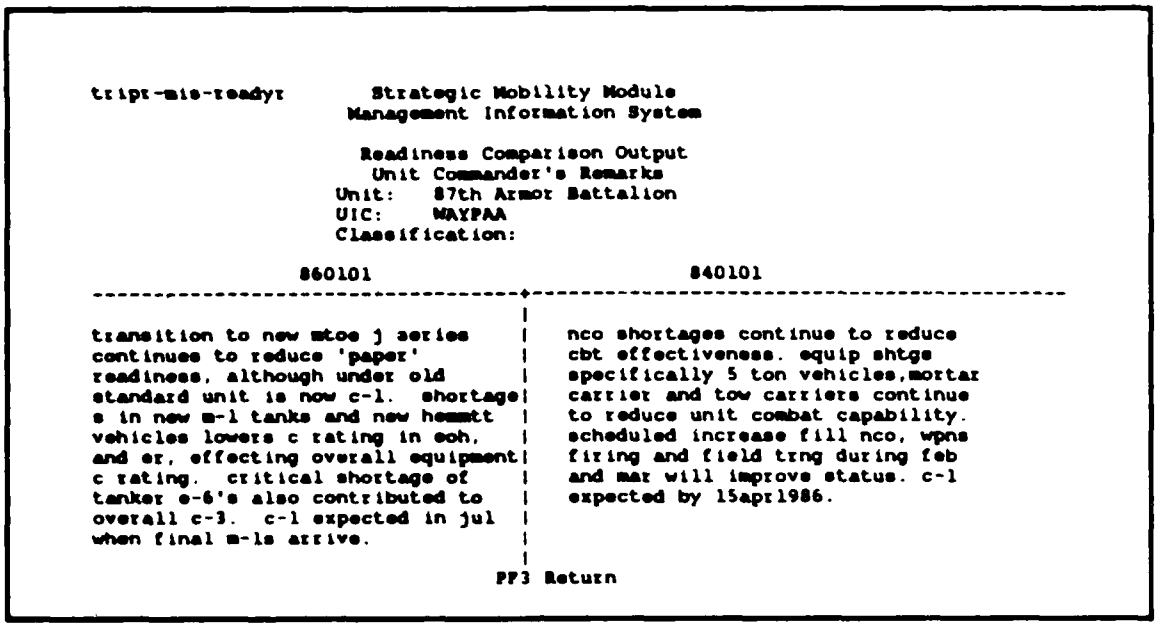
(4) This query will interface with the Force Accounting system and the Readiness Module as required.

Table 3-2. Readiness Comparison Output

Unit: 87th Armor Battalion
UIC: WAYPAA
Classification: UNCLASSIFIED

Readiness measure	860101	840101
Personnel data		
Assigned strength %	98	95
Available strength %	95	90
Available MOS trained %	95	90
Available senior grade %	78	67
Personnel turnover %	14	10
Equipment on hand data		
Total line items	82	70
# Lines rated 1	56	62
# Lines rated 2	03	02
# Lines rated 3	01	02
# Lines rated 4	00	01
Pacing items % of fill	67	95
Equipment status/readiness data		
% Equipment on hand (EOH) mission capable (ES)	97	94
% Pacing items (PI) mission capable (PI-ES)	98	92
% Required mission capable (ER	63	87
% Required PI mission capable (PI-ER)	67	89
Training data		
Weeks to complete training	2	3
Assigned strength shortfall	c	c
Borrowed military manpower	b	a
Availability of funds	b	a
Availability of equipment/materiel	d	b
Availability of qual leaders/status aviator training	a	c
Accessibility of training areas/facility	a	a
Availability of fuel	a	a
Availability of ammunition	a	b
Availability of time	a	a
Overall unit C - rating	3	3
Primary reason not C-1	e	p
Authorization level of organization (ALO)	1	1
Date of report	851215	831215
Parent unit identifier	3	3
Personnel C - rating	1	3
Reason personnel not C-1	a	p
EOH C - rating	2	1
Reason EOH not C-1	p	a
ER C - rating	3	2
Reason ER not C-1	r89	r61
Training C - rating	1	2
Reason training not C-1	p21	t34
Secondary reason overall not C-1	p31	t34
Tertiary reason overall not C-1	t32	r61
Projected overall rating	1	2
Projected date of change in overall	861215	840315

o. Table 3-2 depicts the format of the Unit Readiness Comparison query. The data will be presented as a series of panels with scrolling options.



```
tripr-mis-readyr        Strategic Mobility Module
                      Management Information System

                        Readiness Comparison Output
                         Unit Commander's Remarks
                      Unit:    87th Armor Battalion
                      UIC:     WAYPAA
                      Classification:

              860101                                  840101
-------------------------------------+-----------------------------------------
                                     |
transition to new mtoe j series      |  nco shortages continue to reduce
continues to reduce 'paper'          |  cbt effectiveness. equip shtge
readiness, although under old        |  specifically 5 ton vehicles,mortar
standard unit is now c-1.  shortage  |  carrier and tow carriers continue
s in new m-1 tanks and new hemmtt    |  to reduce unit combat capability.
vehicles lowers c rating in eoh,     |  scheduled increase fill nco, wpns
and er, effecting overall equipment  |  firing and field trng during feb
c rating.  critical shortage of      |  and mar will improve status. c-1
tanker e-6's also contributed to     |  expected by 15apr1986.
overall c-3.  c-1 expected in jul    |
when final m-1s arrive.              |
                                     |
                                PF3 Return
```

Figure 3-68. Readiness Comparison Commander Remarks Reports

p. The unit commander's remarks (Figure 3-68) will also be accessible to the user conducting a readiness comparison query.

```
tripr-mis-orgi          Strategic Mobility Module
                      Management Information System

                          TOE/MTOE Comparison

For an MTOE of interest,
  Enter the Unit Identification Code (UIC) for an actual unit:
                          or
  Enter the Unit Designation for an actual unit:
  (example: 87th Armor Bn)
                          or
  Enter the MTOE number for an actual unit:          5-145JE102
                          and
  Enter the effective dates of the MTOE to compare:
                                                     YYMMDD      YYMMDD
OR
For a TOE of interest:
  Enter the type of unit of interest:
                          or
  Enter the TOE number of interest:
                          and
  Enter the effective dates of the TOE to compare:
                                                     YYMMDD      YYMMDD
                        Press ENTER to continue
PF1 Info                      PF3 Return
```

Figure 3-69. TOE/MTOE Comparison Input Panel

q. TOE/MTOE Comparison Input/Output

(1) Figure 3-69 shows the input for a TOE/MTOE Comparison query.

(2) Outputs of the TOE comparison report would include information concerning the unit type and unit mission. Detailed information would also be available to show, by position code, rank, branch, grade, remarks and number authorized for each ALO for all personnel authorized to the unit. Information concerning equipment would include LIN, nomenclature, description, ERC, and quantity authorized for each ALO. The comparison of the TOEs of two unlike units would also be an option. Data will be initially in tabular form, with the option of graphically presenting some or all of the data.

(3) Outputs of the MTOE comparison report would include information on the specific units active under the MTOE, the unit type and mission statement. Detailed information would include for personnel, the number authorized and required within each position code, rank, branch, grade, and include remarks or narratives. Equipment data available would include the data specified for the TOE report, with the addition of specific numbers authorized and required. Data would be optionally presented graphically.

(4) Users will also have the option of comparing two unlike MTOE/TOE units for a single specified TOE/MTOE effective date using this system.

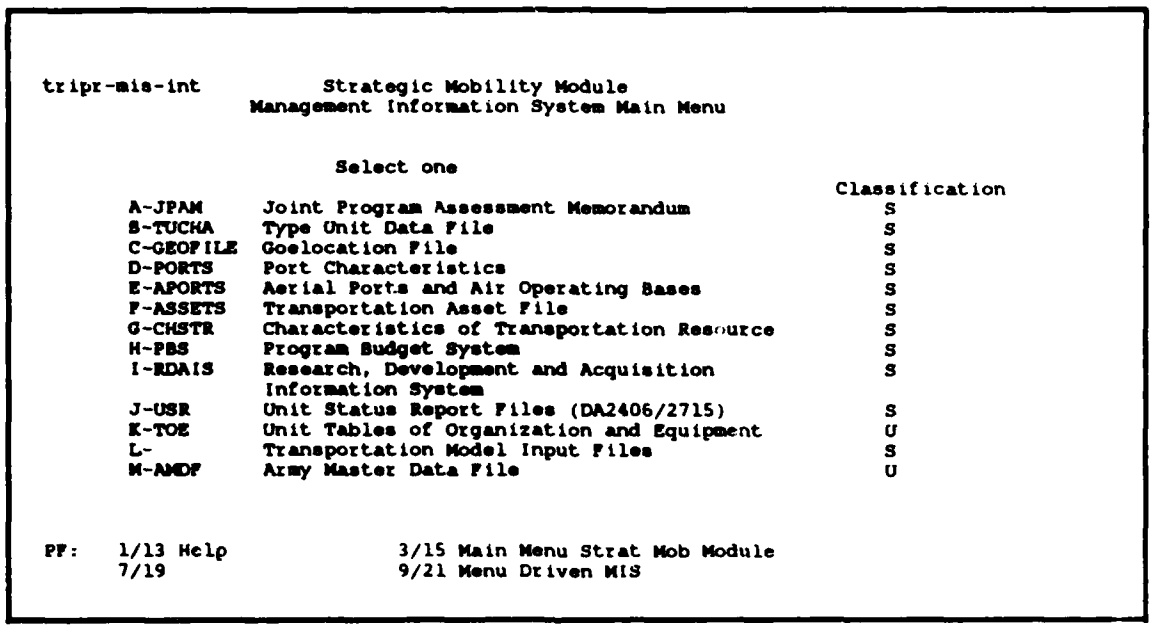


Figure 3-70. Intellect Applications Main Menu

Figure 3-70 is presented when a user selects Intellect Applications from the main menu. It depicts some of the files available for direct query.

3-12. INTELLECT APPLICATIONS INFORMATION

a. The Management Information System will have the capability to interpret queries which are given to the system "in plain English." The HQDA Decision Support System has a software package in place to fulfill this requirement, called Intellect. Should another software package be used in the final system, its capabilities will closely resemble those of Intellect.

b. To use this tool, an action officer chooses an "Intellect" application file. Once the system initializes, the user is prompted to "enter a request." A request of "info" will return a list of the fields of the file being used, similar to the screens presented in this prototype. The user can then enter his request "in plain English." For example, if the user has a query concerning movement requirements and this information need was not fulfilled by using the menu-driven screen, he could enter the request: "Show me the port date and unit name of all requirements that have a travel mode of air." The system would then interpret that request and respond with an appropriate answer. The user will also be able to give data format commands within a query; for example, "pie chart requirements for travel mode = air by type unit." If the system had trouble interpreting the query, it would prompt the user with information on how to make the query more understandable.

c. The specific data screens in this prototype are samples of some of the fields and data in the indicated file. No queries may be done with the prototype.

```
tripr-mis-jpam          Strategic Mobility Module
                     Management Information System
                        Intellect Application
                             JPAM file

Sample of fields:

SEQUENCE-NO          SERVICE              PLAN                 RECORD-TYPE    RDD

REC-DESCRIPTION      UNIT/ACTIV-NAME      LEVEL-OF-UNIT        TRAVEL-MODE    AVAIL-DATE

PORT-DATE            MODE-DATE            POINT-OF-ORIGIN (geoloc data)       DESTINATION

NUMBER-PAX           TPSN                 POD                  ACCOMPANYING-SPLY-STON

BULK-CGO-STON        OVERSIZE-CGO-STON    OUTSIZE-CGO-STON     NON-AIR-TRANSPORTABLE-CGO

ACCOMPANYING-AMMO-STON                    SRC                  FORCE-RQMT-NUMBER

UNIT-TYPE            UIC

+-------------------------------------------------------------------------------+
PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-71. Sample Fields of JPAM File

```
tripr-mis-tucha         Strategic Mobility Module
                     Management Information System
                        Intellect Application
                             TUCHA file

Sample of fields:

SHORT-TYPE-NAME   UNIT-LEVEL   DEPLOYMENT-INDICATOR   SERVICE   SECURITY-CLASSIF

NO-OF-CGO-CATEGORIES   UNIT-TYPE-STATUS   TYPE-NAME   DATE-OF-RECORD-CREATION

DATE-OF-LAST-CHANGE   AUTH-WARTIME-PERSONNEL   NONORGANIC-PASSENGERS

TOTAL-CARGO (contains subfields for quantity of each type cargo)
    bulk-ston,mton; oversize-ston,mton; outsize-ston,mton; nonair-ston,mton
    total-bulk-pol.

CARGO-DESCRIPTION    CARGO-LENGTH    CARGO-WIDTH    CARGO-HEIGHT    SQUARE-FEET

NO-OF-PIECES SHORT-TONS MTONS  UNIT-TYPE-CODE

+-------------------------------------------------------------------------------+
PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-72. Sample Fields of TUCHA File

d. Figures 3-71 through 3-78 depict a sample of the available fields in selected files in order to aid in "plain English" queries.

```
tripr-mis-geo          Strategic Mobility Module
                    Management Information System
                       Intellect Application
                             GEOFILE

Sample of fields:


GEOLOC-CODE   RECORD-LEVEL   RECORD-TYPE   GEOLOC-NAME   INSTALLATION TYPE
COUNTRY-STATE   PROVINCE   TACTICAL-ZONE   COORDINATES (latitude longitude)
LPR-CODE   DATE-CREATION   ARMY-CODE   OCEAN-AREA-CODE   CARGO-DESCRIP
EQ-MODEL-NO   CARGO-CATGY-CODE   CGO-LENGTH   CGO-WIDTH   CGO-SQFT   CGO-STONS
CGO-MTONS   RECORD-CLASSIF   ORIG-UIC


+-------------------------------------------------------------------------------
PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-73. Sample Fields of GEOFILE

```
tripr-mis-ports        Strategic Mobility Module
                    Management Information System
                       Intellect Application
                            PORTS file

Sample of fields:

AIRFIELD-GOELOC-CODE   AFLD-DISTANCE          BEACH-GEOLOC-CODE   BEACH-DISTANCE
GOOD-HOLDING-GROUND    CLASS-S-ANCHORAGE      CLASS-1-ANCHORAGE
CLASS-2-ANCHORAGE      CLASS-3-ANCHORAGE      NBR-HARBORS (expected/reported)
HARBOR-TYPE            POL-STORAGE-CAPABILITY OPEN-STORAGE-CAPABILITY
REFRIG-STORAGE-CAPAB   AMMO-STORAGE-CAPAB     GEN-CGO (stons and mtons)
CONT-CGO (ston/mton)   RORO-CGO (ston/mton)   AMMO-CONT (ston/mton)
AMMO-BKBULK (ston/mton POL-CGO-MBBLS          HARBOR-DESIG
NO-ENTRANCES (expected/reported)              TIDAL-RISE          SWELL
ICE-RESTRICTION        OTHER-RESTRICTIONS     TURN-BASIN (depth/diameter)
CONT-BERTH (length/depth)                     GEN-CGO-BERTH       TANKER-BERTH
RORO-BERTH             RAMPS (&cgo capacity)  CAUSEWAYS (&cgo cap)
CLEARANCE (modes/cap)  ENTRANCES (dimensions) HARBOR-DESIGN       MHE (no/cap)
HARBOR-CRAFT (types/cap)  BEACH (dimensions/cap)
+-------------------------------------------------------------------------------
                                                                            ---+
PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-74. Sample Fields of PORTS File

```
tripr-mis-aports        Strategic Mobility Module
                      Management Information System
                         Intellect Application
                            APORTS file

Sample of fields:


GEOLOC-CODE              CLASSIFICATION          COUNTRY (name/code)
GEO-COORDINATES          LOAD-CLASSIF            DATE (rec created/updated)
CURRENT-CAPABILITY (off/onload)                  POTENTIAL-CAPABILITY
CURRENT-THRU-CAP-CGO POTENTIAL-THRU-CAP-CGO JET-FUEL-STOR-CAP
AVGAS-STOR-CAP           IFR (arr,dep,mix)       VFR (arr,dep,mix)
PARKING-DATA (loaded,unloaded,sq-ft,surge)       TAXIWAY (width,len,surf,cap)
SQFT-STORAGE (open,hazardous,refrig)             PAX-RECEIPT-CAP (curr potent,thru)
WIDEST-TAXIWAY (capacity,surface)                AMMO AREA
NEAREST-PORT-GEOLOC  DIST-TO-PORT                PORT-NAME
NO-OPERATING-PERSONNEL (current,potential)       STATUS-OF-AIRPORT
CLEARANCE (potential&capacity,pax&cgo)           MHE (type,no,capacity)



+-------------------------------------------------------------------------------+
PF:   1/13 Help   2/14        3/15 Return  4/16        5/17        6/18 Intellect
      7/19                    9/21 Menu driven
```

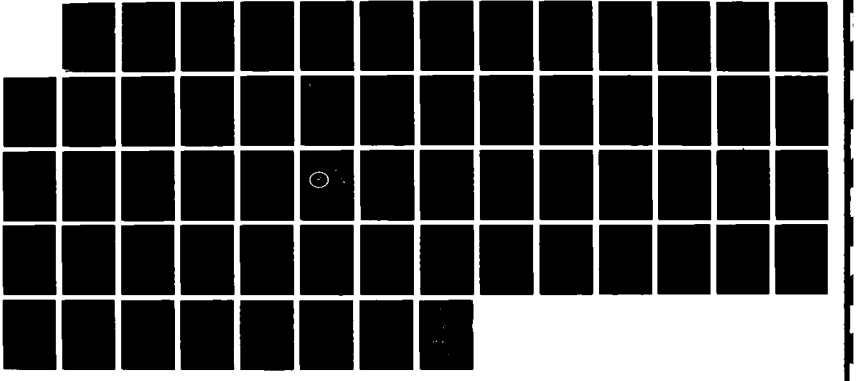
Figure 3-75. Sample Fields of APORTS File

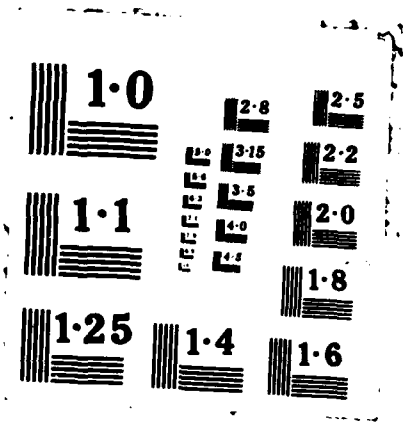
```
tripr-mis-assets        Strategic Mobility Module
                      Management Information System
                         Intellect Application
                            ASSETS file

Sample of fields:

DATE (update,change)

SHIP-TYPE                SHIP-ID              SHIP-SPEED           SHIP DAYS AVA
SHIP-MOB-CONDITION       SHIP-CLASSIF         SHIP-AVAIL-PLAN      SHIP FILL
SHIP-EARLIEST AVAIL

ACFT-TYPE                ACFT-ID              ACFT-FILL            ACFT
ACFT-OUT-OF-THEATER      ACFT-TYPE
ACFT-CLASSIF             ACFT-AVAIL           ACFT-STAGE
+-------------------------------------------
PF:   1/13 Help   2/14        3/15 Return  4/16
      7/19                    9/21 Menu driven
```

Figure 3-76. Sample Fields of Assets

AD-A188 938 TRANSPORTATION IMPROVEMENT PROGRAM REQUIREMENTS (TRIPR): CONCEPT PAPER OF..(U) ARMY CONCEPTS ANALYSIS AGENCY BETHESDA MD R H FAHRINGER ET AL. MAR 87 2/2

UNCLASSIFIED CAA-TP-87-5 F/G 15/5 NL




1·0
2·8
3·15
3·5
2·5
2·2
2·0
1·8
1·1
1·25
1·4
1·6

```
tripr-mis-chstr          Strategic Mobility Module
                       Management Information System
                          Intellect Application
                             CHSTR  file

Sample of fields:

DATE (creation,update)

ACFT-TYPE              BLOCK-SPEED      BULK-PAYLOAD       AVG-OVSIZE-PYLD
AVG-OUTSIZE-PYLD       (characteristics for 2000,2500,3000,3500 nm legs)
AVG-GND-TIME           AVG-LOAD-TIME    AVG-OFFLOAD-TIME   PAX-CAP
PAX-ACCOMPANY          UTIL-RATES (periods)

SHIP-TYPE              SHIP-SPEED       SHIP-CLASSIFIC     SHIP-AVG-SPEED
SHIP-MIN-DRAFT         SHIP-MAX-LENGTH  SHIP-AVG-LD/HR     SHIP-UNLOAD-SQFT/HR
STOW-RATES

+-------------------------------------------------------------------------------+
PF:   1/13 Help   2/14        3/15 Return  4/16         5/17         6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-77. Sample Fields of CHSTR File

```
tripr-mis-usr            Strategic Mobility Module
                       Management Information System
                          Intellect Application
                             FORSTAT file

Sample of fields:

The FORSTAT file contains a complex data structure with many sub-fields and sub-
records.  The few fields and sub-records shown below are only a very  small
portion of the file.

COMPONENT-ID   SERVICE         LEVEL            MAJCMD           STRUCTURE
AUTHORIZED     ASSIGNED        TPSN             UIC              PARENT-UIC-DATA
SUBORDINATE-UIC-DATA           MOVEMENT-DATA
ES/ER-READINESS-DATA

+-------------------------------------------------------------------------------+
PF:   1/13 Help   2/14        3/15 Return  4/16         5/17         6/18 Intellect
      7/19                    9/21 Menu driven
```

Figure 3-78. Sample Fields of FORSTAT File

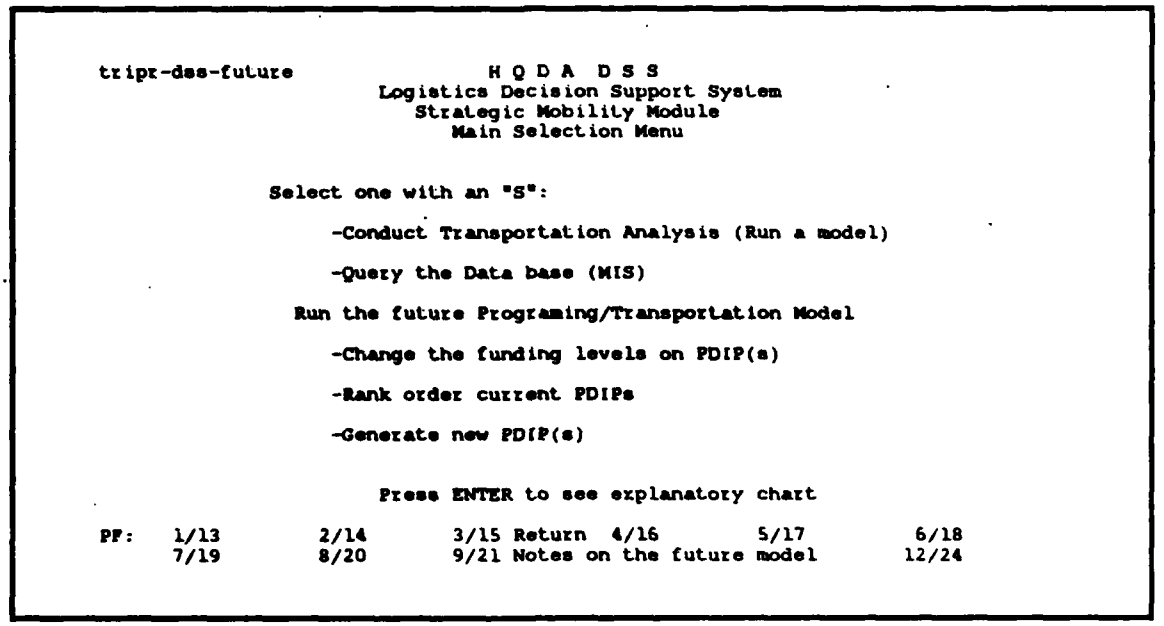


Figure 3-79. Future Main Menu of Strategic Mobility Module

3-13. FUTURE STRATEGIC MOBILITY MODULE. Figure 3-79 appears upon selecting "Possible Future main menu/module" from the LOG DSS menu (Figure 3-5). This development effort will go beyond phase III of the current DSS contract. In the future, the Strategic Mobility Module of the LOG DSS will contain not only transportation analysis simulation models and a decision aid to help rank order PDIPs, but also a new "factory to foxhole" global transportation simulation model to be used in budget programing analysis. This new model will also have the capability to translate PDIP funding level changes into physical asset changes (i.e., translate a loss of $1M in the LOTS PDIP into a degradation in LOTS operations at a specific port) and automatically input such changes into the model for an analysis of the effect on the overall transportation system. The new model will be able to rank order PDIPs in terms of overall benefit to the transportation system, and recommend new capabilities which might be even more beneficial to the system. Model output will be detailed enough to determine exactly where bottlenecks and stoppages occur, as well as provide detailed system performance reports.

a. The intermediate system this prototype depicts requires the Action Officer to research a PDIP, translate the funding change into a capabilities change, modify model inputs, and select and run a specific transportation model.

b. The future system will still include individual transportation analysis models such as MOVER and Mini-MIDAS.

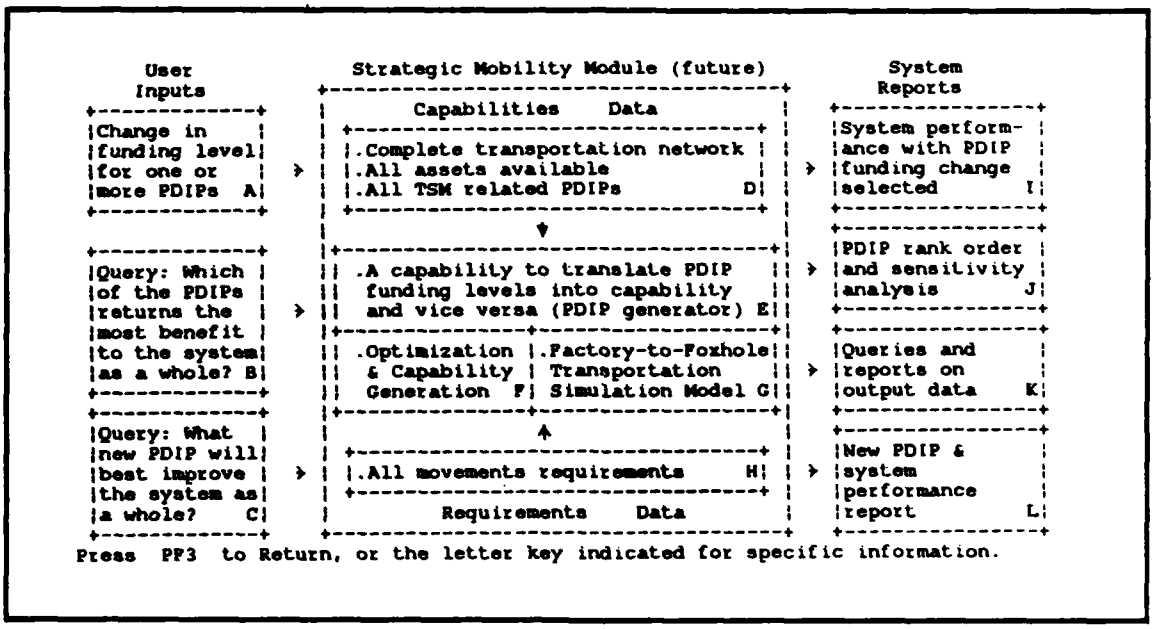


Figure 3-80. Overall Functional Requirements of Future Module

c. The following figures (Figures 3-80 through 3-93) depict the overall functional requirements for the future development of the Strategic Mobility Module. Subsequent panels elaborate on the concepts in each box above and are self-explanatory.

```
     User
    Inputs
 +-------------+
 |Change in    |
 |funding level|
 |for one or   |
 |more PDIPs  A|
 +-------------+
```

The Action officer will have the ability to access data on all PDIPs which have an impact on the global transportation system*. He will have the capability to change the funding level of one or more of those PDIPs in the same manner as he will be able to conduct PDIP what-if type analysis (see the POM/Budget module interface screens). These changes to the Program could, if desired, be his only input for the running of the global transportation simulation model. The action officer would continue to have the ability to change specific model inputs (i.e., unit capabilities, movement requirements, etc) if desired.

*By global transportation system is meant: all the nodes, lifts and links of worldwide transportation network; all of the movements requirements and all of the assets and constraints of world wide military transportation from factory to foxhole, including all of the pipelines (PF1) and the sustainment period. The global transportation system includes all of its subsystems (PF4).

PF1 Pipelines PF3 Return PF4 Sub Systems

Figure 3-81. Input Information 1

Definition of Pipelines Pg 1 of 2

Pipeline Concept of Materiel Distribution. The administrative and physical structure through which demands for materiel are expressed and goods flow to the point of ultimate use is known as the distribution pipeline of supply. A pipeline signifies a channel for mobility toward an objective rather than a stationary concept of fixed storage.

1. Some provision for storage is necessary to ensure dependable supply. Along a military supply route there must be reservoirs where quantities of goods are temporarily held. The accumulation at each of these waystations may be considered insurance against failures intransit and adequate transmission of supplies from points in the rear. These reservoirs and carriers (ships, barges, trains, motor vehicles, planes, or oil pipelines) loaded with cargo constitute the logistics pipeline. Interpreted in a broader sense, the word pipeline would include the stocks held as reserves for future contingencies, such as mobilization reserves or stocks accumulated for future military exercises, as well as materiel stored for early or immediate issue in support of the current activities of the military services at home and abroad.

2. The pipeline is both physical (with storage locations and transportation facilities) and administrative (requiring processing of documents). The physical structure of the pipeline makes possible the flow of

PF1 Continue PF3 Return

Figure 3-82. Pipeline Definition 1

```
                    Definition of Pipelines          Pg 2 of 2

materiel through the military distribution system from the point of receipt
from procurement or production to the point of final use.  Every physical
element of the pipeline has a corresponding administrative element, be-
cause every movement of supplies requires processing of documents.  Document
processing times may exceed the time for the physical movement of supplies.

          3.  The pipeline requirements for movement of personnel and
materiel represent the movement requirements for the transportation system.
The scope of the future model encompasses ten pipelines depicting all move-
ments in support of all services.  The pipelines are:
                    .Unit Deployment
                    .POMCUS/prepositioned storage
                    .General resupply
                    .Repair parts
                    .Major end items
                    .Ammunition
                    .Replacement personnel
                    .CONUS mobilization
                    .All retrograde personnel and cargo movement:
                        noncombatant evacuation, POWs, captured equipment,
                        medical evacuation and all other categories
                    .Petroleum, oils and lubricants (bulk)
                              PF3  Return
```

Figure 3-83. Pipeline Definition 2

```
                Subsystems of the Global Transportation System      Pg 1 of 2

A valuable method for maintaining the comprehensiveness of the structure of the
transportation system is to consider the throughput capability of each component
of the system in terms of the four major subsystems which provide the mechanism
for the movement through the system.  The components are the nodes, lifts and
links previously described, while the subsystems are personnel, facilities and
equipment, enformation, and management.

          .Management.  The management  subsystem consists of the policies
and procedures which affect the flow of cargo or people through the transporta-
tion system.  Under the management subsystem are the various guidelines and
policies that influence the other subsystems.  An example is the DOD direction
to increase the usage of intermodal lift to satisfy movement requirements.

          .Information.  The information subsystem is the required flow of
data for the monitoring of cargo while it is in the transportation system.  It
encompasses computer equipment, communications netqorkd and the personnel to
generate and transmit information.  Each node must have the capability to
receive, store, process and transmit information.  Information links such as

PF1 Continue                        PF3  Return
```

Figure 3-84. Subsystems Definition 1

Subsystems of the Global Transportation System Pg 2 of 2

.Personnel. The personnel subsystem is the people who perform loading and offloading operations, cargo documentation, and monitoring of contract personnel in the performance of their jobs. It is important to note that without personnel to man the various nodes, to maintain the physical links between nodes, and to operate the various equipment, the throughput of the other subsystems would be zero.

.Facilities and Equipment. The facilities and equipment subsystem provides the physical capabilities of a node or movement resource. The facilities and equipment subsystem at a node impacts its ability to receive, ste store, process and discharge cargo. The links refer to such things as road capacity from fleets of transportation assets.

PF3 Return

Figure 3-85. Subsystems Definition 2

User Inputs

+----------+
|Query: Which |
|of the PDIPs |
|returns the |
|most benefit |
|to the system|
|as a whole? B|
+----------+

The Action officer will have the capability to ask this question of the global transportation model. The question will be based upon either the set of PDIPs and their funding levels which the AO is currently working on or some other set. Numerous sets of PDIPs and their funding level data will be maintained for comparison purposes. The AO will be given a choice of indicators which he desires to use as measures of effectiveness (MOE) and transportation system evaluation factors (SEF). A possible beginning of a list of such factors may be found in the information screen for PDIP rank-ordering, as part of the current development. As an alternative, the AO may select a 'default' set of MOE and SEF, which will be a reflection of current Army/organization policy/procedures.

PF3 Return

Figure 3-86. Input Information 2

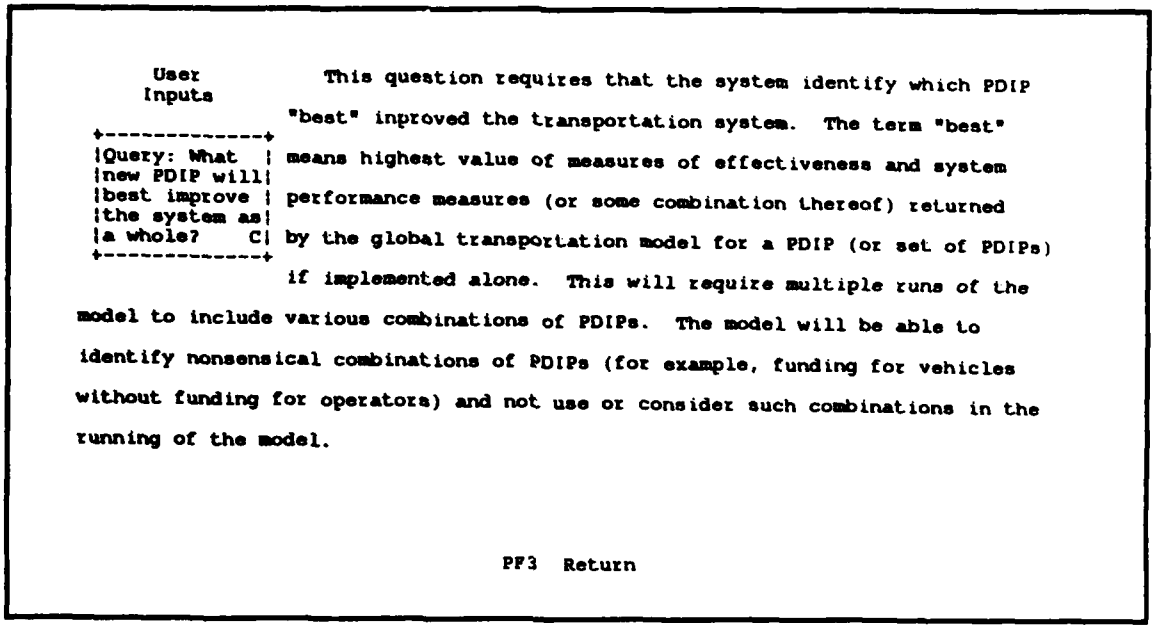


Figure 3-87. Input Information 3

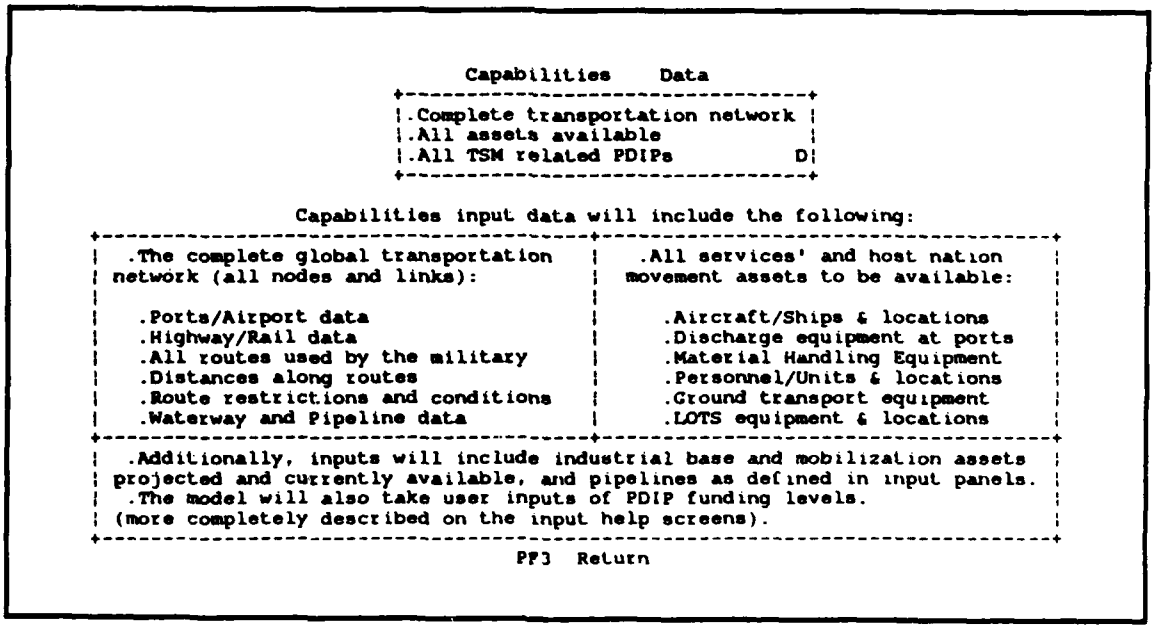


Figure 3-88. Capabilities Data Requirement

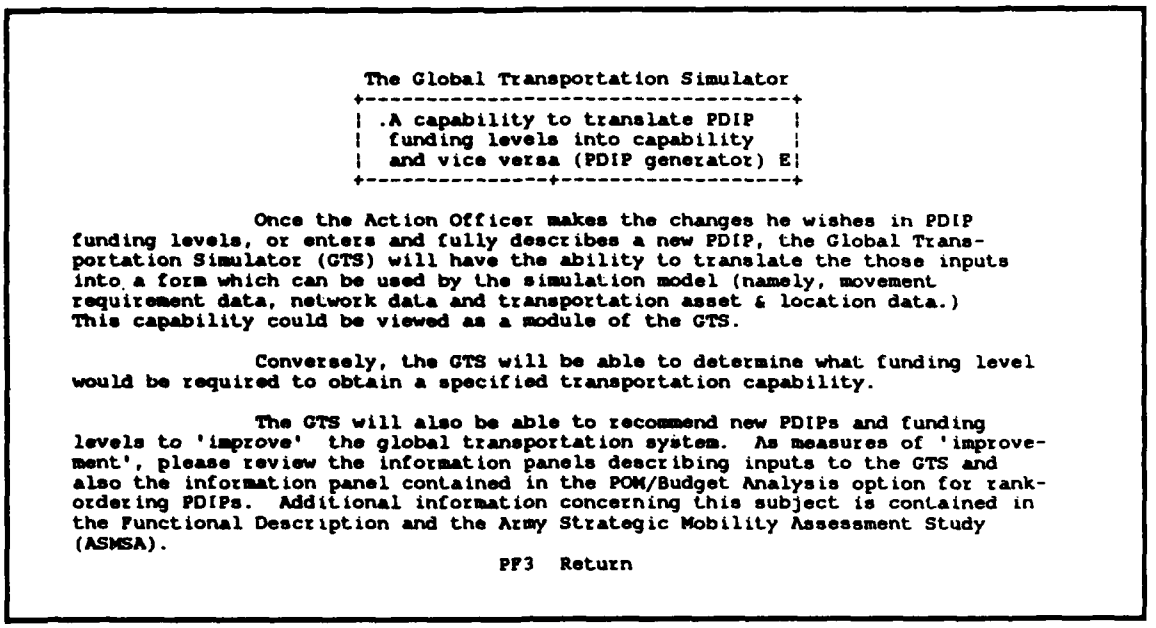


Figure 3-89. Model Function Information 1

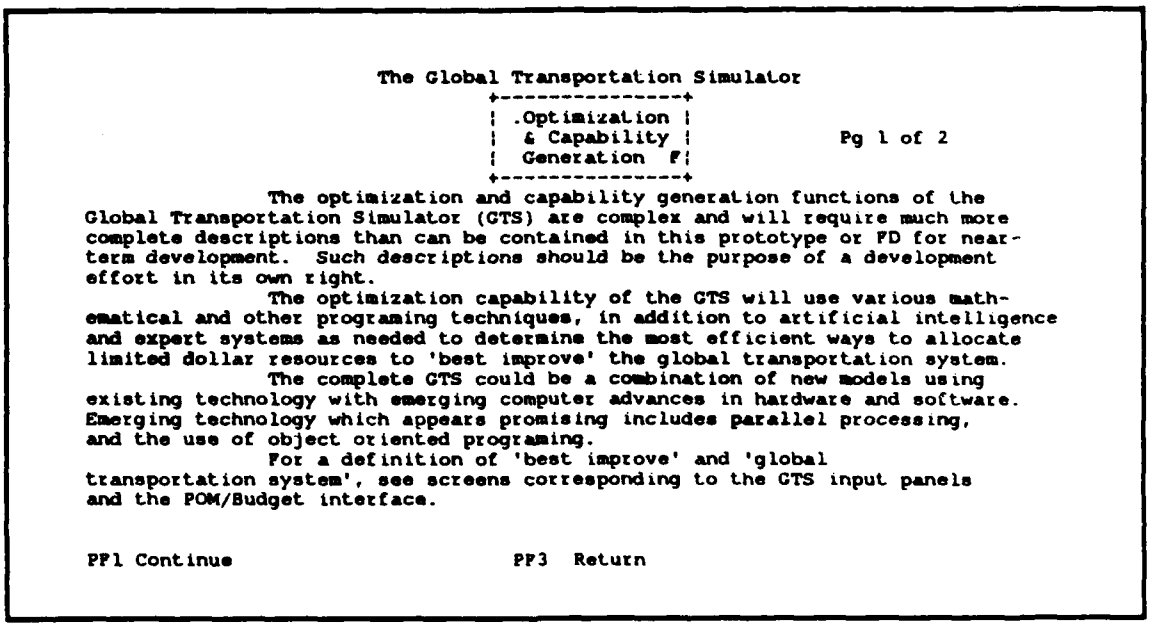


Figure 3-90. Model Function Information 2

The Global Transportation Simulator

+----------------+
| .Optimization |
| & Capability |
| Generation F|
+----------------+

Pg 2 of 2

The GTS will also be capable of generating new capabilities which would 'better improve' the global transportation system for fewer or equal resources; it would also be able to identify new capabilities which, although they would be more expensive in terms of resources, would vastly improve the global system.

The new model will also include the following factors:

.attrition
.terrain
.weather
.damage to the network (including wear damage)

PF1 Continue PF3 Return

Figure 3-91. Model Function Information 2A

The Global Transportation Simulator

+--------------------+
|.Factory-to-Foxhole|
| Transportation |
| Simulation Model G|
+--------------------+

In order to meet the many requirements specified, a new model called here the Global Transportation Simulator (GTS) must be developed. The linkage of existing models is viewed as inadequate, since each model was designed with a different purpose in mind, has a different set of assumptions associated with it, and contains different algorithms and modeling techniques. Also, existing models do not address all of the subsystems of the Global Transportation System, which are absolutely essential in the GTS. For the short term, however, the linkage of various models will meet the needs of the Action Officer.

At this time, no specific modeling technique or combination of techniques has been determined to be required for the model. In all probability the model will use mathematical programing, artificial intelligence, and expert system techniques. The functions required of the GTS are essentially those specified for the Strategic Mobility Module of the LOGDSS in its FD, Concept Paper and this prototype. However, the development of this model should be accomplished as a project and contract in and of itself, due to the complexity and level of detail required.

PF3 Return

Figure 3-92. Model Function Information 3

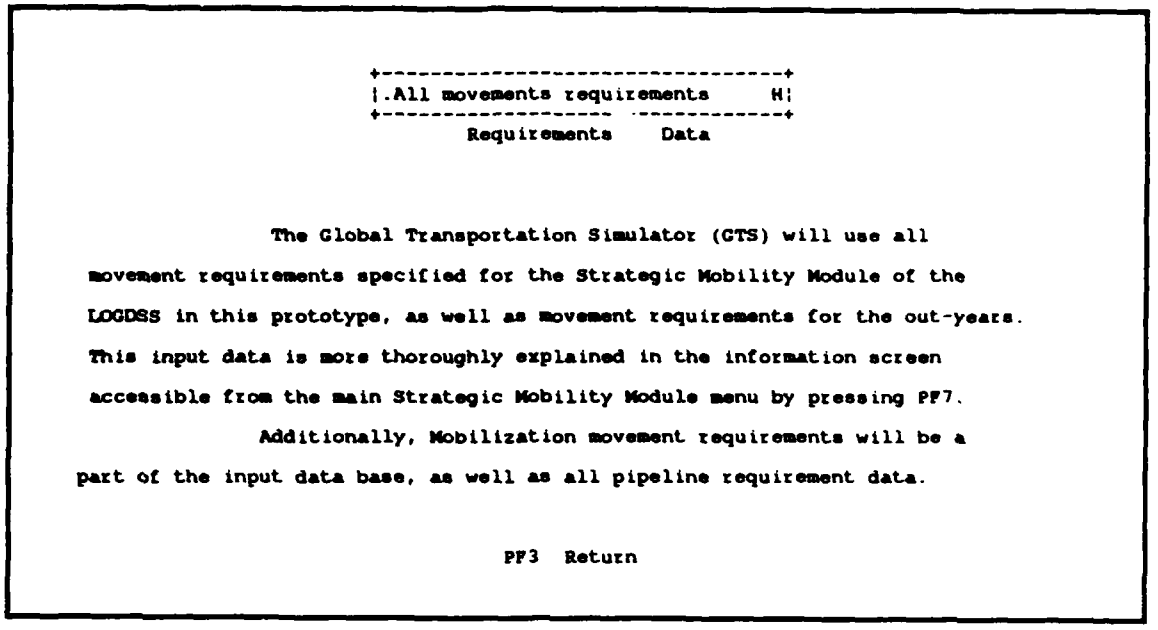


Figure 3-93. Requirements Data

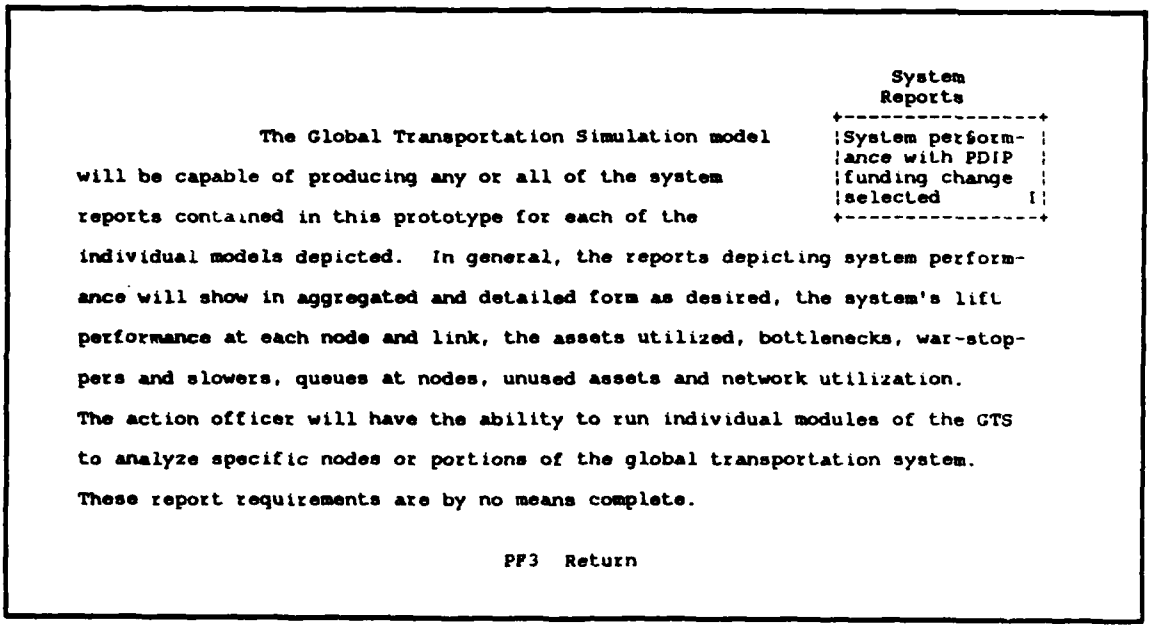


Figure 3-94. Report Requirements 1

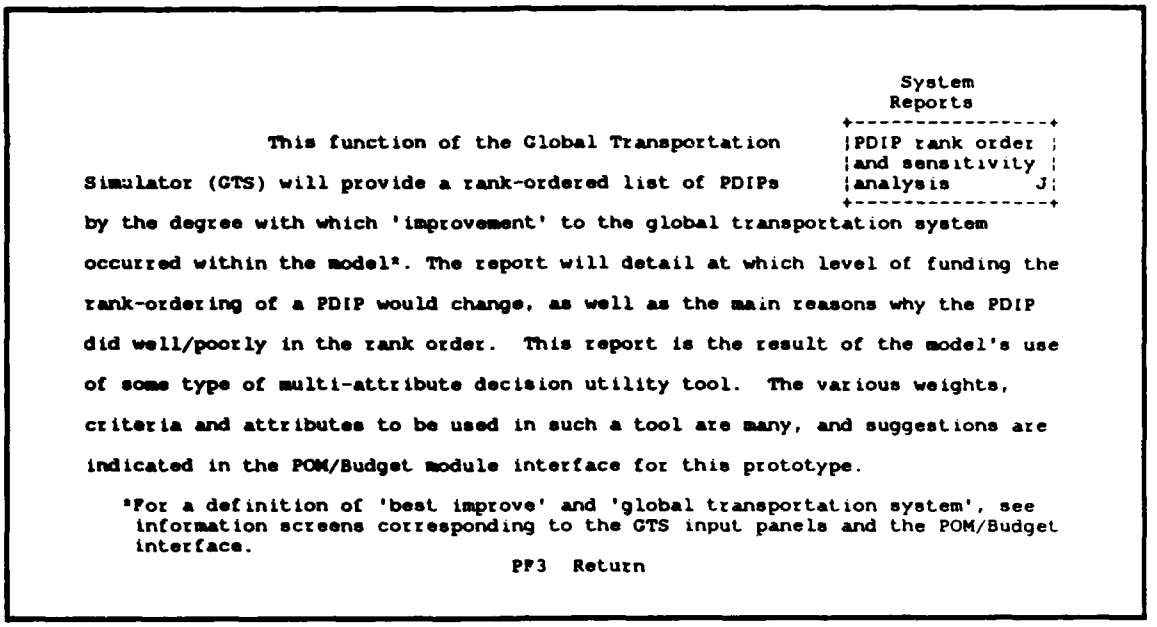


Figure 3-95. Report Requirements 2

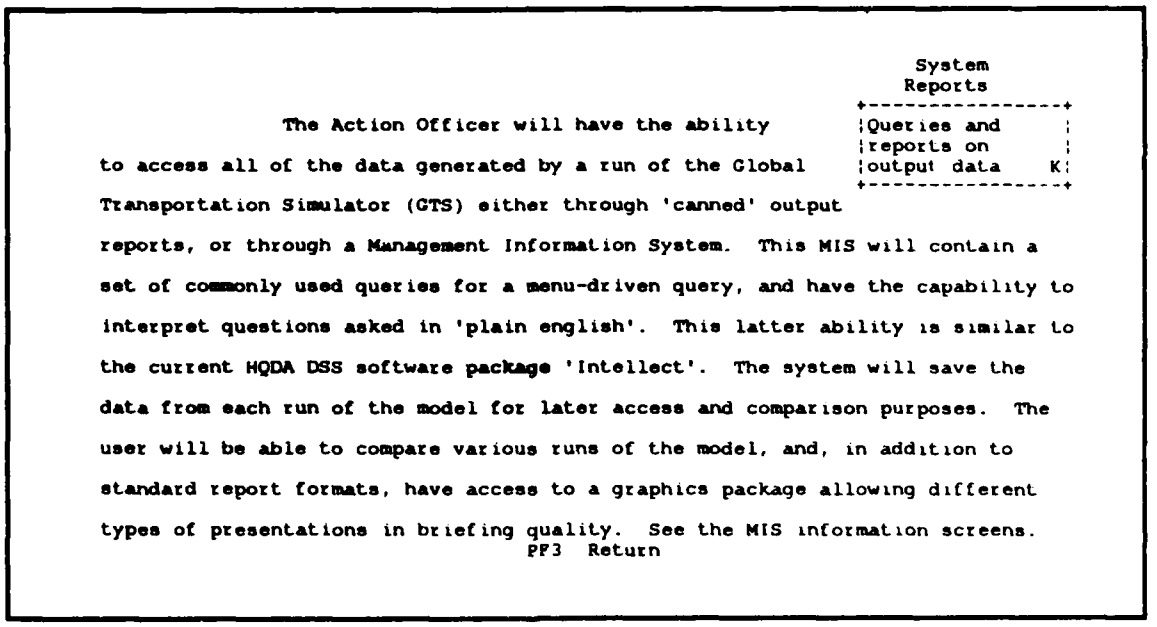


Figure 3-96. Report Requirements 3

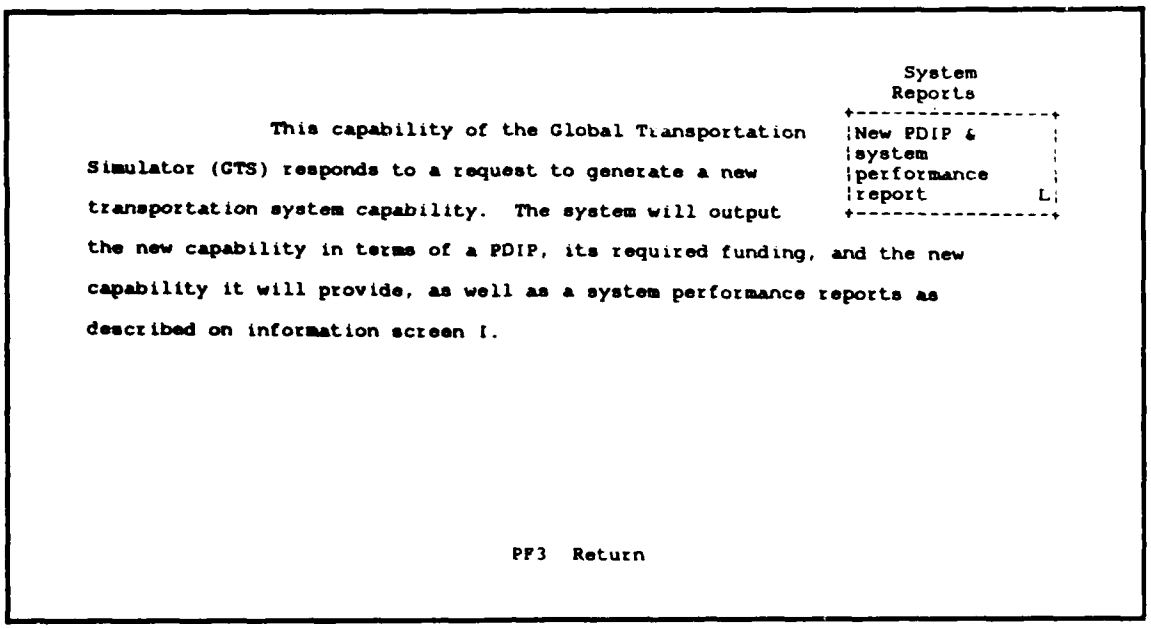


Figure 3-97. Report Requirements 4

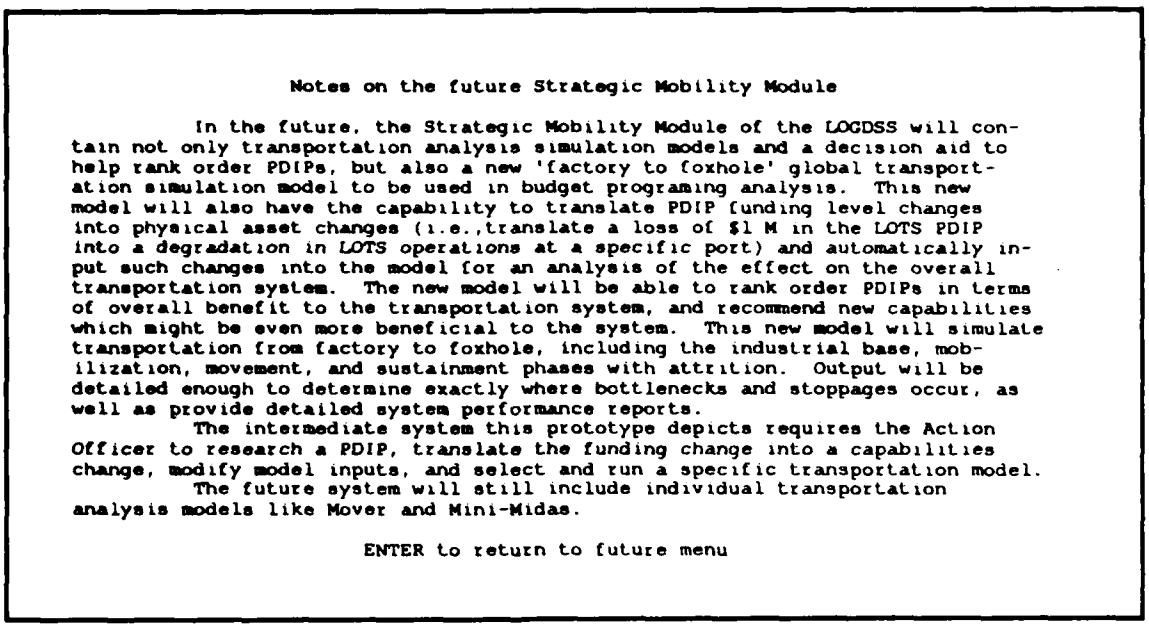


Figure 3-98. Notes on the Future Model

CHAPTER 4

RISK

4-1. TECHNICAL RISK. The overall risk associated with the development of the Strategic Mobility Module of the LOG DSS is considered low to moderate.

a. MIS. The risk associated with the MIS portion of the system is considered very low. Adequate technical expertise exists to perform the data base management tasks required with the data bases indicated.

b. Models. The risk associated with the technical tasks of the models is considered moderate. Each model is currently PC-based and will require modification to run on the mainframe. Additional modification is required to construct interfaces with panels, data bases, and graphical packages. Also, each model uses a different high-level language which will need to be compiled for mainframe use. In the case of the multiattribute decision utility for rank ordering PDIPs, the model will need to be developed.

c. Future System. The risk associated with the technical tasks of the future model is high. The degree of resolution required, turnaround time requirements, and methodology of the future model are, in all probability, not able to be satisfied with current technology. Because of the magnitude of the transportation system and the analytical techniques required, the future system will require substantial use of emerging technology.

4-2. DEVELOPMENTAL RISK

a. MIS. The development of the MIS portion of the system is considered very low risk.

b. Models. The implementation of the models onto the system is of moderate risk. The required technical manipulation of the models is very complex; however, it can be accomplished with existing technology.

c. Future System. The risks associated with the development of the future system envisioned beyond Phase III of the SSM are high. There is no model that is capable of simulating the global transportation system. The development of this quick response global transportation model, as described in Chapter 3, may be unable to withstand the scrutiny of model validation and verification. The magnitude of the procedure which must be developed to translate the changes in PDIP funding levels into transportation system capabilities and then identifying which of these PDIPs returns the most benefit to the system as a whole may likely be beyond current technology or be too costly to develop.

APPENDIX A

STUDY CONTRIBUTORS

1. STUDY TEAM

a. Study Director

LTC Robert H. Fahringer

b. Team Members

MAJ Robert G. Albrecht Jr.
CPT Joseph W. Mislinski
Ms. Tara L. King

c. Other Contributors

MAJ Robert J. Peresich
Ms. Almeda M. Burchfield
Mr. Ronald J. Iekel

2. TECHNICAL REVIEW PANEL

Ms. Patricia M. Fleming
LTC Francis V. Campi
MAJ Richard G. Poulos

APPENDIX B

STUDY DIRECTIVE

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310-05

DALO-TSM (1-21) (5-5c) 18 JUN 1987

MEMORANDUM FOR: Director, U. S. Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797

SUBJECT: Army Strategic Mobility System Assessment (ASMSA)

1. References:

a. HQDA DCSLOG Study Directive, dated 1 Dec 86, subject as above.

b. Letter, CSCA-SPM, dated 27 Apr 85 (sic), subject: Transportation Improvement Program 3 (TRIP3) Army Strategic Mobility System Assessment (ASMSA).

2. Reference 1a directed initiation of Phase II of the Army Strategic Mobility System Assessment (ASMSA). Reference 1b recommended revision of reference 1a to reflect reevaluation of CAA capabilities to develop the Strategic Mobility Module of the ODCSLOG Decision Support System, and to develop an interface for PC based models.

3. Reference 1a is revised as follows:

a. Add to paragraph 3 the following sub-paragraph c:

Develop a methodology for conducting an inter/intratheater transportation study and provide a transportation study for the NEA theater.

b. Delete the last sentence of paragraph 6a(1).

c. Substitute the following for paragraph 6a(2)(c):

PC based transportation models (MOVER, SHAKER, Mini-MIDAS, Airlift/Sealift) will be assessed to determine their utility for use by action officers on the PC. Following the assessment, models will be provided to TSM, along with parametric data bases when sufficient default data is not contained in the model, training, and a suitable JPAM-based requirements data base.

d. Substitute the following for paragraph 6b(2):

(a) Develop the concept paper and functional description to support development of the Strategic Mobility Module of the ODCSLOG DSS.

(b) Assess and provide PC based transportation models.

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e. In paragraph 6e, change the date for the availability of Shaker to September 1987 and Mini-MIDAS to June 1987.

f. Substitute the following for paragraph 6f(2):

(2) Programming.

(a) What are the strategic mobility system assessment requirements generated by PDIPs?

(b) What kind of strategic mobility related PDIP analysis and resource changes can PC-based models evaluate?

(c) How can each PC-based model be used to evaluate the impact of each kind of strategic mobility system related PDIP analysis and resource change?

(d) What PC-based model modifications must be made to enable Strategic Mobility Division action officers to use the model for program analysis?

g. Add the following as paragraph 6i:

Limitations. Attrition and retrograde movement requirements will not be simulated in the NEA planning study or PC-based models; however both will be included as a functional requirement in the Functional Description.

h. Delete paragraph 7b(4).

i. Add the following as paragraph 9b(12):

DOD 7935.1-STD, Automated Data Systems (ADS) Documentation Standards, Office of the Assistant Secretary of Defense (Comptroller), 24 April 1984.

j. Change paragraph 10b Milestones to read:

(1) Complete Concept Paper and Functional Description	Mar 87
(2) Publish NEA study report	Dec 87
(3) Complete Model Evaluation/ Documentation	Apr 88

k. Change paragraph 10d Phase II Deliverables to read:

(1) Concept paper and functional description documenting user requirements for the Strategic Mobility Module.

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(2) Study report documenting a methodology for conducting an inter/intratheater transportation study and providing results of a transportation study for the NEA theater.

(3) Copies of the PC-based models' software disks and supporting parametric and requirements data base disks. An assessment of the models' documentation, operation, and recommended modifications for model use will also be provided.

4. Reference 1a as amended by this document constitutes the ASMSA Phase II study directive.

FOR THE DEPUTY CHIEF OF STAFF FOR LOGISTICS:

PAUL C. HURLEY
Brigadier General, GS
Sponsor's Study Director

DEPARTMENT OF THE ARMY
DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310-0500

DALO-TSM (2-82) 1 DEC 1986

SUBJECT: Army Strategic Mobility System Assessment (ASMSA)

Director
U. S. Army Concepts Analysis Agency
8120 Woodmont Avenue
Bethesda, MD 20814-2797

1. PURPOSE OF STUDY DIRECTIVE. This directive authorizes the initiation of Phase II of the Army Strategic Mobility System Assessment (ASMSA). This will continue the development of a process that objectively evaluates the total strategic mobility system and optimizes total system performance given present and proposed policies, and procedural and funding strategies that impact on the transportation system. It is a direct follow-on to the ASMSA Phase I feasibility study and will provide a near term analytic capability using existing transportation models and the ODCSLOG Decision Support System (DSS). ASMSA Phase II will also provide a basis for the long term development of an ASMSA prototype using new and emerging state of the art automation capabilities.

2. BACKGROUND. The Army has made considerable progress toward improving its capability to project and sustain forces. Many aspects of the mobility system have been the focus of aggressive but often independent initiatives. There is concern that the system's net throughput may not be improved because of remaining unrecognized bottlenecks. This concern led to a DCSLOG initiative to find a mechanism for systematically evaluating and improving the net capability of the total transportation system, hence, ASMSA. Phase I of ASMSA was a study to determine the feasibility of designing a transportation analysis process to assist ODCSLOG in reviewing the adequacy of strategic mobility policies and programs and in developing inputs to the Program Objective Memorandum (POM) development process. The U. S. Army Concepts Analysis Agency (CAA), the study agency, determined that ASMSA is feasible and provided recommendations for development.

3. PURPOSE OF THE STUDY. The overall ASMSA initiative outlines a progressive, multi-phased, long range effort to provide the analytical means to define mobility requirements, capabilities and shortfalls and identify actions which will result in the

greatest improvement to overall system delivery capability. The final objective is to assure a balanced total transportation system. The purpose of Phase II is to:

a. Provide a near term analytical capability that will give action officers in the Strategic Mobility Division, HQDA, a quick response interface with existing models to assess the state of the strategic mobility system and begin to determine where resources can be applied most profitably.

b. Serve as a baseline for the long term development of a state of the art automated decision support system that can meet ODCSLOG-unique transportation analytic needs.

4. STUDY SPONSOR. Office of the Deputy Chief of Staff for Logistics (ODCSLOG). Sponsor's Study Director (SSD) - Director for Transportation, Energy and Troop Support (DTRETS).

5. STUDY AGENCY. U. S. Army Concepts Analysis Agency (CAA).

6. TERMS OF REFERENCE.

a. Scope.

(1) The ASMSA process must be capable of evaluating the movement of programed Army forces and sustaining supplies from their origins to and through aerial and sea ports of embarkation, to and through worldwide theater ports of debarkation, and onward to final destinations for employment. The process must permit sensitivity analysis of all aspects of transportation required to mobilize, deploy, and sustain Army forces worldwide. The transportation system's constraints and limitations must be identified in ways that lead directly to recommended changes in transportation policies, procedures, and funding through the program years. In addition, the process must be able to analyze the transportation system's capability and its sensitivity to the prioritization of such variables as time, money, force structure, etc. Follow-on phases to Phase II will include: continued modification of quick response transportation models; the development of a functional description following the points of analysis of the Strategic Mobility Module statement of work and the ASMSA Study Report; and, the development of a prototype transportation model.

(2) Phase II Scope.

(a) ASMSA Phase II will provide a process to evaluate the movement of programed Army forces from CONUS through sea and

aerial ports of embarkation, to and through a theater port of debarkation and onward to the ultimate destinations. Movement of personnel or cargo below the Corps level will not be considered. Also this phase will not include a detailed description of the CONUS transportation network or the information subsystem.

(b) The process will link main frame models (TRANSMO-SITAP) for simulation and analysis to identify bottlenecks and shortfalls in the transportation system in support of the development of The Army Plan (TAP) input and formulation of program input.

(c) A customized interface will be constructed for the PC based models (MOVER, SHAKER, Mini-MIDAS) as they become available. They will be used in support of a quick response capability for programing analysis.

(d) Phase II will include the points of analysis contained in subtask 7a, "Develop Prototype and Functional Description for Strategic Mobility Module, work statement for Logistics Decision Support System" (attached as an Addendum), and the DSS requirements specified in ASMSA Study Report 1 Sep 85.

b. Objective. To provide a near term capability for ODCSLOG to meet strategic mobility programing and planning requirements. This capability will be used as a foundation for the continued development of a DSS in future phases. Specifically,

(1) Planning. Develop a methodology at CAA to perform transportation planning studies for DCSLOG and demonstrate this methodology through a transportation analysis of a single theater of operations.

(2) Programing.

(a) Implement a Management Information System (MIS) to allow access to standard data bases and extraction of information in desired formats (i.e., reports, graphics) to support ODCSLOG strategic mobility analysis.

(b) Develop a quick response capability for intertheater and intratheater mobility analysis to allow ODCSLOG to assist in mobility program development and program change assessment.

c. Timeframe. The Phase II effort shall be structured to support the development of the 1990-1994 POM.

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SUBJECT: Army Strategic Mobility System Assessment (ASMSA)

d. Constraints.

(1) Providing all data bases for use of the action officer at his work station is dependent upon secure communications lines from the host computer to DALO-TSM.

(2) The Management Information System and mini-models must conform to the specifications of the Logistics DSS.

e. Assumptions. Identified mini-models will be available at CAA by the following specified times:

(1) MOVER - December 1986;

(2) SHAKER - April 1987; and

(3) Mini-MIDAS - February 1987.

f. Essential Elements of Analysis (EEA).

(1) Planning.

(a) During the deployment and sustainment of the Northeast Asia (NEA) theater of operations, what are the transportation system bottlenecks and shortfalls for inter- and intratheater movements? (NEA selected due to availability of MTMC Korean Port Study for comparison.)

(b) What are policy and procedure changes which can be implemented to reduce bottlenecks and shortfalls? What is the effect on cargo delivery of implementing new policy and procedural guidance?

(c) Where personnel, facilities and equipment contribute to shortfalls and bottlenecks, what additional resources or reallocation of resources are required to alleviate the problem areas?

(d) What is the effect on cargo flow of readding/reallocating resources to critical links in the transportation network?

(2) Programing. What are the changes to transportation system flow resulting from identified program modifications (PDIPs)?

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g. Environmental and threat guidance. No environmental impact is anticipated; however, the study sponsor will address any environmental considerations that develop during the study or as a result of its application.

h. Estimated cost savings. This study effort has the potential to generate cost savings; however, they cannot be quantified at this time.

7. RESPONSIBILITIES.

a. The ODCSLOG will:

(1) Provide a study sponsor's technical representative.

(2) Establish a Study Advisory Group (SAG) and designate a Chairperson.

(3) Designate or identify a point of contact (POC) at MACOMs, TOAs, and other agencies as required.

(4) Keep CAA advised of the DCSLOG Logistics Program Module (LPM) in-process reviews, SAGs and critical changes affecting the DCSLOG LPM development effort.

b. CAA will:

(1) Designate a study director and establish a full-time study team.

(2) Establish direct communication with ODCSLOG and other agencies as required for the conduct of the study.

(3) Provide periodic in-process reviews (IPR) and final study documentation to the study sponsor.

(4) Provide programing and ADP support as required for the conduct of the study.

8. LITERATURE SEARCH.

a. OSD strategic mobility studies.

b. JCS strategic mobility studies.

c. MTMC CONUS deployability studies, port capacity analyses, and installation outloading capability studies.

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SUBJECT: Army Strategic Mobility System Assessment (ASMSA)

9. REFERENCES.

a. Administrative.

(1) AR 5-5, The Army Study Program.

(2) DA Pamphlet 5-5, Guidance for Study Sponsors and Study Advisory Groups.

b. Substantive.

(1) CAA-SR-86-25, Army Strategic Mobility System Assessment, September 1986.

(2) Joint Program Assessment Memorandum (JPAM) FY 88-92, April 1986.

(3) Work statement for Logistics Decision Support System, March 1986.

(4) Simulator for Transportation Analysis and Planning (SITAP) User's Manual, 30 September 1977.

(5) Transportation Model (TRANSMO) Software Documentation (TRANSMO Users Manual), January 1983.

(6) TRANSMO Users Manual Addendum, November 1983.

(7) MOVER Model Documentation Manuals, Information Spectrum, Inc., 1986.

(8) SHAKER Simulation Model, SAG meeting, October 1986.

(9) Mini-MIDAS (Multi-optioned Interactive and Analytic System) Functional Description (Draft), January 1986.

(10) U. S. Army Unit Level Enlisted Strength and Personnel Management Actions FORECAST System, System Development Plan Stage II (Draft), March 1984.

(11) The Korean Ports and Transportation Capability Study, MTMC Report TE 83-3h-46.

10. ADMINISTRATION.

a. Support.

DALO-TSM
SUBJECT: Army Strategic Mobility System Assessment (ASMSA)

(1) Funding for temporary duty (TDY) and travel associated with the study will be provided by each participating agency.

(2) Automatic data processing equipment (ADPE) will be provided by both CAA and ODCSLOG.

b. Milestone Schedule.

(1)	Study Plan/Study Directive Approval	Dec 86
(2)	IPR Planning and Programing (MOVER/MIS)	Mar 87
(3)	SAG Planning and Programing Results	Oct 87
(4)	Publish Study Report and Model Demonstration	Dec 87

c. Control Procedures.

(1) The ODCSLOG will designate a SAG chairperson. Periodic IPR will be provided to the SAG.

(2) The ODCSLOG study technical representative will serve as the day-to-day contact for the study within the ARSTAF.

d. Phase II Deliverables.

(1) A Study Report documenting a methodology for a detailed analytic assessment of the transportation system using TRANSMO-SITAP models to assist DALO-TSM in meeting their Army Plan analysis requirements.

(2) A User's Manual documenting the user requirements for the operation of the PC based mini-models.

(3) A User's Manual documenting the operation of the Management Information System.

e. Coordination. This study directive has been coordinated with CAA in accordance with AR 10-38.

Benjamin F. Register Jr.
BENJAMIN F. REGISTER, JR.
Lieutenant General, GS
Deputy Chief of Staff
for Logistics

APPENDIX C

REFERENCES

DEPARTMENT OF DEFENSE

Department of Defense (DOD) Publications

DOD Standard 7935.1, Automated Data Systems (ADS) Documentation Standards, April 24, 1984

JOINT CHIEFS OF STAFF

Joint Chiefs of Staff (JCS) Publications

Movement Requirements for Staff Planning and Special Studies Applications (MORSA), Joint Data Systems Support Center, August 1972

DEPARTMENT OF ARMY

Deputy Chief of Staff for Logistics (DCSLOG)

DCSLOG Regulation 10-1, Organization and Functions, January 1985

US Army Concepts Analysis Agency (CAA)

Army Strategic Mobility System Assessment (ASMA), US Army Concepts Analysis Agency, CAA-SR-86-25, September 1986

US Army Service Schools and Institutes

US Army War College

Army Command and Management; Theory and Practice, August 1985

AFSC Pub 1, Joint Staff Officer's Guide - 1986, Armed Forces Staff College, Norfolk, VA, 1 July 1986

MISCELLANEOUS

Building Effective Decision Support Systems, Ralph H. Sprague, Jr. and Eric D. Carlson, Prentice Hall, Englewood Cliffs, NJ, 1982

Microcomputer Decision Support Systems Design Implementation and Evaluation, QED Information Sciences Inc., Wellesley, MA, 1986

Information Systems Definition: The Multiview Approach, A.T. Wood-Harper, Lyn Antill, and D. E. Avison, Blackwell Scientific Publicatons, 1985

An Introduction to Database Systems, C. J. Date, Addison-Wesley Publishing company, Inc., 1986

Dan Bricklin's Demo Program, Software Garden, Inc. (Software package used to construct the prototype), 1985

APPENDIX D

EXCERPT FROM STATEMENT OF WORK

1. OBJECTIVE

The contractor shall furnish all necessary personnel, materials, facilities (unless otherwise specified) and other services as may be required to develop a Prototype, Functional Description (FD), System Specification, System Design and the initial operational core modules of the ODCSLOG Decision Support System (DSS).

2. BACKGROUND

The mission of the Office of the Deputy Chief of Staff for Logistics (ODCSLOG) is to ensure that the Total Army (Active Army, Army National Guard, Army Reserve) is properly equipped, maintained, and sustained. This mission encompasses the following fourteen major functions:

a. Resources and Management: Plan, program, budget and defend resources required for secondary items; depot maintenance operations; supply, transportation and logistics functions; and base operations support. Coordinate programming, budgeting and defense of all logistics functions. Manage operations of the Army Stock Fund and Army Industrial Fund.

b. Supply Management: Establish policies and procedures for the management and control of all materiel (less medical peculiar items and nontactical management information equipment with the exception of Logistics Applications of Automated Marking and Reading Symbols <LOGMARS>). Establish policy for the management of war reserves. Establish Department of Army (DA) policy for: supply requirement computations, commodity management, operation of all supply activities; management of selected special supply subsystems; the supply system of the Army reserve components; Integrated Logistics Support (ILS), and the distribution and redistribution of major items of equipment and secondary items.

c. Force Structure/Force Management: Determine through equipment supportability analyses, the Army's ability to support force structure activations and conversions, and Table of Organization and Equipment (TOE) modifications. Coordinate and control all actions concerning the logistics force structure. Coordinate and approve equipment allowances in all authorization documents. Determine the optimum quantity and mix of logistics support units to support the Program Objective Memorandum (POM) force structure and contingency operations. Approve equipment allowances for Major Army Command (MACOM) proponent proposed The Army Authorization Document System (TAADS) documents requiring DA approval. Ensure that the Effective Date (E-DATE) recommended for a proposed Modification Table of

Organization and Equipment (MTOE) can be resourced without adverse impact on unit readiness.

d. Maintenance: Establish user and producer maintenance policy for the Army and evaluate maintenance policy for impact on force structure development and sustainment of equipment. Analyze maintenance support concepts for war, contingency, joint operations and peacetime operations. Establish policy pertaining to workload accomplishment of intermediate maintenance units both forward and rear. Develop policy and procedures for the conduct of day to day maintenance operations and disseminate them to the Army in the field as The Army Maintenance Management System (TAMMS - DA PAM 738-750). Evaluate execution of maintenance policy and procedures by developing and supervising DA maintenance reporting systems. These systems include Sample Data Collection (SDC) programs which can be directed at reliability, availability and maintainability of individual items of equipment, and Equipment Historical Availability Trends (EHAT) reports which measure the effectiveness of maintenance activities and equipment materiel readiness. Develop planning guidance, less financial data, for the maintenance portions of the Five Year Defense Plan (FYDP), Army Logistics Assessment (ALA), Mission Area Analysis, Program Budget Guidance (PBG) Memorandum, Program Objective Memorandum (POM), and the Army Force Development Plan.

e. Contracting and Competition: Manage the contracting functions of the Army in accordance with the directions of the Army Procurement Executive, the Chief of Staff of the Army and the Deputy Chief of Staff for Logistics (DCSLOG) in consonance with Government-wide and Department of Defense (DOD) policies as may be expressed in the Federal Acquisition Regulation (FAR), issuances of the Office of Management and Budget (OMB), including the Office of Federal Procurement Policy (OFPP), the General Services Administration (GSA), and the Federal Emergency Management Agency (FEMA), the Defense FAR Supplement (DFARS) and pertinent Department of Defense Directives (DODD) and Instructions (DODI). This management responsibility is exercised over all Army contracting functions except real property transactions and without reference to sources of authorization, appropriations, or allotment. Develop competition strategy for new and existing acquisitions of hardware, supplies and services. Maintain competition statistics and develop methods to access, sort and manipulate competition data.

f. Transportation Management: Develop DA policy, procedures, and guidance on transportation services for DA-sponsored cargo shipments; movement documentation; and non-tactical vehicles. Exercise DA Staff supervision over strategic mobility aspects of war and contingency plans; transportation concepts, doctrine and force structure; mobilization and deployment exercises; control of strategic transportation resources; Army standard transportation ADP systems; container system development; and transportation assets (rail, and watercraft), and Non-Tactical Vehicles.

Acts as the ODCSLOG focal point of contact for all transportation/mobility aspects of the Joint Operations Planning System (JOPS).

g. Energy and Water: Exercise DA Staff supervision over energy matters and bulk petroleum logistics by developing, coordinating and recommending concepts, plans, policies, programs and systems with respect to the allocation, supply distribution, use and conservation of energy resources within the Department of the Army. Serves as DOD Executive Agent and Army proponent for management of land based water resources.

h. Services: Exercise DA staff supervision over the Troop Support Agency (TSA), which serves as the central management agency for the Army Food Program (commissary, troop issue, subsistence, wholesale subsistence supply, garrison and field food service), laundry and dry cleaning program, clothing sales/ initial issue activities program and personal-related organizational clothing and individual equipment items program, field laundry, bath and bakery programs, and the Army graves registration program. Establish DA policy on subsistence supply, feeding soldiers, commissary operations, clothing, organizational and individual equipment items, and field services.

i. Security Assistance: Develop, coordinate and control Army Security Assistance Policy and Planning. Coordinate all taskings to DA Staff agencies for matters related to security assistance. Keep the Army leadership, DOD, and the Congress informed concerning security assistance matters. Act as Appropriation Director for the Foreign Military Sales (FMS) administrative budget (8242), Military Assistance Program (MAP) budget (1080), and act as functional program director for security assistance generated manpower requirements.

j. Major End Items: Exercise life cycle management of major end items. Maintain vertical inventory management to support Army modernization initiatives and operational readiness decisions on weapon systems. Enhance and implement the Total Army Equipment Distribution Plan (TAEDP). Support the Planning, Programming, Budgeting, and Execution System (PPBES) Cycle with major end item data for division sized or larger organizations. Provide major equipment data resulting from proposed force structure changes and proposed activation/reorganizations that have a major impact on the Army's ability to equip the force.

k. Operations/Crisis Action Management: Ensure the application of modern automation and communications capabilities to the integration of logistics within Operational Plans (OPLANS) during crisis action situations.

l. Logistics Command and Control: Ensure logistics commanders at all levels are provided with all communication, personnel, equipment, facilities, and procedures required in planning, directing, coordinating, and controlling assigned forces.

m. Information Management: Act as the focal point for the Information Mission Area to include: automation, communication, records management, publications and audio visual support. Establish and maintain the Army's Logistics Information Architecture and manage the logistics information program.

n. Ammunition: Establish and maintain the life cycle management (acquisition, storage, maintenance, disposition, and disposal) of ammunition. Coordinate the interface of the Army automated ammunition management information systems with other services' automated systems. Act as DOD single manager for conventional ammunition.

The ultimate goal of the ODCSLOG DSS is to provide all levels of the agency with timely, integrated and consistent information on which to base decisions to ensure the best allocation of resources. The DSS will have the capabilities to access, sort, retrieve, change, manipulate and extrapolate data from numerous sources both at the micro and macro level of detail. It will perform analyses on data from these data bases based upon known and "futuristic" changes to programs, structure and policy. The DSS will eventually be capable of providing automatically necessary routine reports and allow individual queries from all levels to answer specific questions.

The DSS will be developed by integrating a number of interactive functional modules similar to the major functions above. These modules have interactive subfunctions that will have the capabilities described above and are designed to assess the impact of multiple changes within each functional area and any spin-off to the other areas will be highlighted for further assessment. These functional modules will be linked to a core module that will have the capability to analyze diverse outputs from the functional modules to provide aggregate analysis. This core module, the Logistics Program Module (LPM), optimizes the outputs of the other functional modules through modeling techniques, and is an integral part of the total DSS development process. All capabilities built into the functional modules will exist in the LPM, but it will have a higher level of optimization capability by allowing the manipulation of larger numbers within changing parameters.

The development of the ODCSLOG DSS, in conjunction with the Logistic Data Base (LOGDB), will provide the logistics community with a single source of information on which to base key decisions. The benefits to the Army by developing the DSS would be:

(1) Improved capability to provide senior decision makers with concise, accurate and timely management information.

(2) Better capability to provide balanced logistical support to the total force (Active Army, Army National Guard and Army Reserve).

(3) Enhanced capability to predict the impact of proposed or actual program/force structure changes, unit activations, reorganizations, production slippages/increases, etc. on unit readiness.

(4) Improved capability to equip and sustain the total force resulting in improved operational readiness.

(5) Enhanced capability for logistics planners to accomplish crisis management planning in support of troop deployments.

(6) Improved capability for transportation planning, operations and movements control and management.

TASKS

The Contractor shall provide services to accomplish the following tasks:

PHASE I

OPTION 6

TASK - DEVELOP PROTOTYPE AND FD FOR TRETS MODULES.

BACKGROUND:

The Directorate of Transportation, Energy and Troop Support (TRETS) has a number of divergent missions which include transportation management, strategic mobility, energy management and troop support services. Subtasks included in this module are:

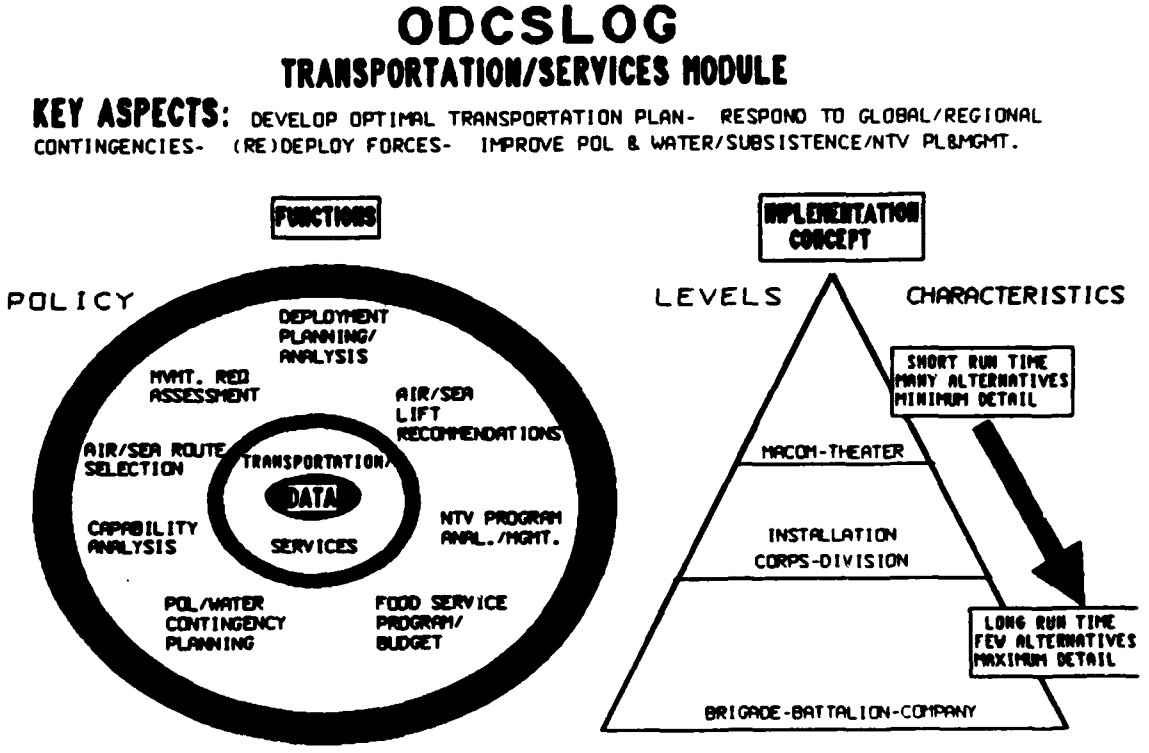

Figure 7. TRANSPORTATION/SERVICES MODULE

2. SUBTASK 7A - DEVELOP PROTOTYPE AND FD FOR STRATEGIC MOBILITY MODULE.

a. BACKGROUND:

U.S. military strategic approach to deterrence includes a global strategy, regional priorities, and the flexibility to conduct sequential operations. The ability to respond to regional contingencies is based on the availability of forces and lift assets--both air and sea. The flexi-

bility to conduct sequential operations is based on the lift requirements, time available, force involved, and assets provided. The capability to conduct redeployments in terms of time required, forces, or lift assets from one theater to another needs to be evaluated using automation techniques, possibly driven by a linear programming model. The results of the strategic mobility portion of the DSS should provide the relationship between delivery times; lift assets; forces; and petroleum, oil, and lubricants (POL) usage. Specifically, the system will provide readily available information for timely decision making, concerning strategic options or operational alternatives displayed in both data and graphics format in keeping with the points of analysis below.

b. The prototype and FD will consider, as a minimum, the capability to:

(1) Determine the relationship between air/sea lift assets and closure times in deploying and redeploying specific forces from CONUS to an overseas theater, and from one overseas theater of operations to another, in order to conduct intertheater lift assessments.

(2) Determine combinations of air/land and sea routes between two theaters/various locations.

(3) Determine the possible combinations of air and sea lift assets required to meet the specific range of closure dates, for each route or combination of routes.

(4) Determine deployment estimates by air and sea for various units. For example: determine the time required to deploy an Army Division to Europe/Southwest Asia (SWA).

(5) Determine the impact of various lift combinations on deployment. For example: What are trade-offs between more sealift and less airlift, etc. on closure overseas?

(6) Determine the ability of Terminal Service & Watercraft Companies to off-load arriving sealift at oversea ports. For example:

(a) Given a ship arrival schedule, can the ships be off-loaded as they arrive? What are the delays?

(b) What are the requirements for Terminal Service and Watercraft Companies for fixed ports and Logistics-Over-The-Shore (LOTS) operation?

(7) Determine the impact of various POMCUS levels in terms of lift requirements and force closure dates.

(8) Determine type unit movement characteristics using TUCHA/TAEDP. For example:

(a) Obtain SRC information.

(b) State outyear equipment distribution and equipment characteristics respectively.

(9) Conduct intertheater lift assessments which consider the following variables:

(a) Range of closure dates by theater.

(b) Combinations of (decremented) air/sea assets.

(c) Iterative overflight rights (alternate routes).

(d) Iterative wartime host nation support.

(e) Various forces and combinations of available transportation assets.

(f) A nucleus of several scenarios in varying time frames.

(g) Combination of air/sea ports of embarkation/ debarkation.

(10) Develop a Management Information System (MIS) containing transportation capabilities and standard Army force movement requirements to fulfill information requirements needed under crisis conditions. This MIS is required to support the stipulations of Annex E to Army Mobilization and Operations Plan (AMOP) IV. This document is classified and will be made available to the contractor for review (providing a necessary clearance has been obtained). A variety of sources are available to interface with or draw information from in the development of the MIS, particularly the Joint Deployment System (JDS) and the Joint Operational Planning and Execution System (JOPES). Other sources include: Mobility Interactive Deployment and Simulation (MIDAS) model, Transportation Model (TRANSMO), MOVER/SHAKER Model, Simulator for Transportation Analysis of Planning Module (SITAP), Program Budget System (PBS) Dictionary Report, and the Army Strategic Mobility System Assessment (ASMSA).

PHASE II

OPTION 6

TASK - DEVELOP A SYSTEM SPECIFICATION AND SYSTEM DESIGN IAW FD.

Refine the prototype, update the functional description based on the refined prototype, and develop a system specification, system development plan and a data requirements document for the TRETS Module.

PHASE III

OPTION 6

TASK - DEVELOP THE TRETS MODULE AS PART OF THE LOG DSS.

Develop the initial operational TRETS Module based on the system specification, the system development plan and the data requirements document.

CONTRACTOR GUIDELINES.

1. PHASE I.

a. Recognizing that there is normally an inverse relationship between response time and level of detail, the development of the FD will consider establishing different levels of aggregation. For example; Level 1 -- highest aggregation to Level 3 -- highest level of detail, which will provide the ability to quickly answer "what if" questions based on broad assumptions which can later be used as a basis for more detailed answers. In the same manner, the contractor shall provide a phased development schedule where each phase provides an operational system at different levels of aggregation.

b. The following general guidelines shall be considered in the development of the functional description:

(1) In the first 30 days, the contractor shall survey the functional area and provide a high level concept paper for a prototype.

(2) Functional area users shall review this concept paper within one week.

(3) Contractor shall provide initial prototype to functional area users within 60 days of project initiation.

(4) Both contractor and functional area user shall work together during Phase I to refine the prototype and develop a FD.

(5) Prototype shall be examples using FORECAST hardware/software depicting the types of analyses the functional user could expect to perform on his/her task. ADP and telecommunications support shall be provided by FORECAST's main frame, distributed processors and communications network. All development using FORECAST shall comply with FORECAST's standards. See paragraph 6.

(6) User intervention capability shall be developed around the functional user's environment and expected ADP capabilities/experience. Appropriate safeguards shall be provided for the system operator to insure that information is not changed, updated or accessed, without his/her knowledge.

(7) The contractor shall provide an assessment of existing and planned hardware and communications capabilities to support the proposed system in section 5 of the FD and identify new equipment/ communications necessary to implement the proposed system as described in section 2 of the FD.

(8) Contractor shall provide appropriate cost estimates for implementation of the proposed system as described in the FD to include hardware, communications, software development, documentation, and maintenance in section 5 of the FD. Total estimated cost must be broken down into appropriate sub-systems to allow for incremental development and implementation if required by the Government. The delivered product, once reviewed by the Department of the Army, shall be used as a source for competitive, contractual design development.

(9) The Contracting Officer should be notified, through the COR, of specific instances where it is either prudent, or necessary, for work to deviate from these guidelines.

(10) After thorough review of the prototype, a FD shall be developed.

2. PHASE II.

The prototype shall be enhanced, the FD updated, and a system specification and system design shall be accomplished in accordance with the FD.

3. PHASE III.

An initial operating system shall be developed. The capabilities of this system shall be defined during Phases I and II.

DOCUMENTATION STANDARDS.

All documentation developed or revised shall follow general documentation standards and regulations as follows:

a. USAMSSA (now USAISC-P) Operation Procedures Security Manual.

b. FORECAST Security SOP.

c. DOD 7935 Automated Data Systems Documentation Standards.

d. Technical Bulletin 18-111, Army Automation Technical Documentation.

e. 101-36.1305-2 FIPS PUB 24, Flow Chart Symbols and Their Usage in Information Processing.

f. 101-36.1305-3 FIPS PUB 30, Software Summary for Describing Computer Programs and Automated Data Systems.

g. 101-36.1305-4 FIPS PUB 53, Transmittal Form for Describing Computer Magnetic Tape File Properties.

h. Technical Bulletin 18-100. Army Automation Life Cycle Management.

i. Technical Bulletin 18-103. Army Automation Software Design and Development.

j. Technical Bulletin 18-109. Army Automation Economic Analysis.

k. Technical Bulletin 18-110. Army Automation Configuration Management.

SOFTWARE DESIGN STANDARDS.

The following published standards and procedures shall be followed during the design of this system:

a. Comply with the FORECAST published standards:

(1) FORECAST Panel Standards

(2) FORECAST Data Base Management Standards (DBMS)

(3) FORECAST Data Element Dictionary

b. Make maximum utilization of existing hardware capabilities.

c. Make maximum use of design concepts and software routines already develop under previous or ongoing contracts, specifically the ODCSLOG Logistics Data Base (LOGDB), which consists of the Information, Data/Application, Engineering, and Geographic Architectures.

d. Make maximum use of the routines in the FORECAST Utility Library.

e. Present all design concepts to the COR for approval.

f. Critical Design Reviews (CDRs) shall be conducted by the contractor. CDR schedule shall be included in the System Development Plan.

g. Informal design reviews shall be scheduled by the COR at his discretion.

h. All on-line applications shall operate on a three megabyte machine or less.

APPENDIX E

MODEL BASE MANAGEMENT SYSTEM

E-1. INTRODUCTION. The Transportation Models Submodule is, in essence, a model base management system whereby a set of transportation simulations and other decision aid models are made available to the user in an interactive environment. The models interact with the data base to draw their input data, and interact with the host computer environment's library of graphic and statistical packages to produce output. The interface among these various systems will be panel driven and invisible to the user. Four transportation simulation models and a multiattribute utility model have been identified as initial models for the system and are described below. They are Mini-MIDAS, SHAKER, MOVER, Airlift/Sealift, and a to-be-developed decision aid for rank ordering PDIPs. Additional models are also identified and described in this appendix and are candidates for inclusion in the system.

E-2. INITIAL TRANSPORTATION SIMULATION MODELS

a. Mini-MIDAS is a PC-based, aggregate, intertheater transportation simulation model currently under development by the General Research Corporation. It is written in Turbo-Pascal and is being designed for quick turnaround analysis of strategic mobility deployments. Inputs to the model include data on the transportation assets, network, capabilities, and movement requirements. Output of the model is in the form of a movement schedule. This model should meet most of the intertheater requirements specified in Section 3.

b. SHAKER is a PC-based, low-resolution LOTS and fixed port capabilities model currently under development by Information Spectrum, Inc. SHAKER is written in SLAM and is designed to determine capabilities and shortfalls for a given LOTS or fixed port scenario. Inputs to the model include cargo to be delivered and ship capabilities. Output reports are in the form of throughput capability (short tons, pieces) and shortfall (short tons, pieces, ships in queue). One port per simulation is modeled.

c. MOVER is a PC-based, low-resolution LOTS requirements model developed by Information Spectrum, Inc. MOVER is written in BASIC and is designed to determine the requirements for a given LOTS scenario. Inputs include equipment onhand, cargo to be delivered, required delivery dates, and objectives are constraints. Output is in the form of reports which depict the required equipment and personnel needed to meet RDDs and daily requirements. One port per simulation is modeled.

d. The Airlift/Sealift Model is a highly aggregated LOTUS spreadsheet developed by the Strategic Mobility Division of TRETS (DALO-TSM). It is a calculation-based requirements/capabilities model in spreadsheet form which takes as inputs specific asset quantities, distances, time requirements, and cargo to be moved, each for a user-specified ship/plane type. Ship/plane characteristics (speed, payload capacity) may be changed by the user. The user specifies cargo assignments to

individual lift assets and specifies all other input for each lift asset. The model calculates either time required to deploy or number of each type lift asset required. Sea and air are modeled separately. No constraints on PODs or POEs are modeled. The model is used for very rapid intertheater mobility analysis; its greatest advantage is its speed and simplicity.

E-3. MODELS WHICH ARE CANDIDATES FOR INCLUSION IN THE SYSTEM

a. MIDAS (Model for Intertheater Deployment by Air and Sea) was developed by GRC for OSD. It is a high-resolution, intertheater strategic deployment scheduling and simulation model which has relatively long run times (in excess of 2 hours) for complex scenarios. MIDAS would have to undergo significant modification to shorten run times as a minimum.

b. RAPDISIM (Rapid Intertheater Deployment Simulation) is a low-resolution, intertheater deployment model used to aid JCS in achieving a rapid simulation of the movement of combat and support units required for a contingency operation. It has a relatively short run time (generally 10 minutes or less of CPU time). RAPIDSIM was developed by GRC and is very similar to MIDAS in structure. Modifications to the model would probably include additional air and seaports, as well as including port constraints. RAPIDSIM would appear to be a very attractive addition to the model base as a capability in addition to Mini-MIDAS.

c. SITAP (Simulator for Transportation Analysis and Planning) is a low resolution, generalized, intratheater transportation simulation originally designed in 1968. SITAP is extremely slow in terms of run time (average of 60-250 minutes of CPU time) and is written in FORTRAN IV. SITAP has exceeded its anticipated life cycle by 9 years, and its validity has been under question for some time.

d. SUMMITS (Scenario Unrestricted Mobility Model for Intratheater Simulation) is currently under development by General Research Corporation. The model is a high-resolution simulation on intratheater movement of equipment, troops, and resupply from an air or seaport of debarkation to a designated destination through a multinodal transportation network in an optimal fashion. The model should interface directly with MIDAS. Since there is currently no capability to model intratheater movements in the specified models in paragraph E-2 above, SUMMITS is a prime candidate for early inclusion in the model base. A solid link would have to be constructed to ensure that data outputs of an intertheater model would feed the intratheater model.

e. TAC THUNDER LIFT is a high-resolution, strategic mobility model which simulates inter- and intratheater level logistics to include air, rail, road, and sea components, although its primary concern is intertheater air movements. It was developed by the Air Force Center for Studies and Analysis. The model is in the latter stages of development by CACI and should be ready for use in July 1987.

f. TRANSMO (Transportation Model) is a low-resolution, primarily intertheater, strategic mobility model developed in 1973 to provide an estimated force closure schedule. The model has been modified to allow for CONUS and intratheater movements in a limited fashion. The run time is approximately 45 minutes. Due to the age and insufficient documentation of the model, its use for DSS purposes is seen as improbable.

g. I-TRANS and G-TRANS are IBM-PC based, low-resolution, intra/intertheater transportation simulation models written in Turbo-Pascal. The models were developed for the Army War College by Interactive Microcomputer Applications, Inc. and have been adopted for use by the Army Transportation School. The I-TRANS Model (intratheater) appears to fulfill the need for an intratheater model currently missing from the required models list in paragraph 2 above. The G-TRANS Model (intertheater) appears to be an attractive candidate for addition to the system due to its speed and simplicity of use.

h. The Contingency Force Analysis Methodology (CFAM) Model is a linear/goal programing package developed by Vector Research, Inc. (VRI) for CAA in 1982 for contingency plan evaluation. Through its interactive mode, CFAM allows a user to perform quick tradeoff analysis between planning factors and intertheater lift options. CFAM investigates tradeoffs by assessing the effects of changing of adding/deleting planning factors. CFAM was used in the ILA (Intertheater Lift Assessment) Study; ILA also produced nomographs to plan strategic mobility operations. Both CFAM and the ILA Study nomographs are good candidates for inclusion into the strategic mobility module.

i. MAPS II (Mobility Analysis and Planning System) is an automated scheduling system which simulates the movement of forces and supplies from origins in the US to destinations (i.e., destinations within the US and Canada), airports of embarkation (APOE) and through seaports of embarkation (SPOE) in the US to seaports of debarkation (SPOD).

j. US Navy Ships Capability Model. At this time, information about this model is somewhat nebulous. The model is PC-based and IBM-compatible.

E-4. FUTURE MODEL DEVELOPMENT. It should be emphasized that this list of candidate models is not all inclusive. As a minimum, for initial implementation, the models described in paragraph E-2 will be a part of the system. In the future, beyond Phase III, several additional models (perhaps some of those described above) should be available to the AO for use in transportation analysis. The set of models ultimately residing in the model base of the strategic mobility module must include analysis of all theaters of operation, CONUS, and intratheater (within a theater) legs of the transportation system. Also, the future module will include a new "factory to foxhole" simulation model with PDIP funding level changes as inputs. "Foxhole," for purposes of the Strategic Mobility Module, means the division support command area. In effect, the ultimate model or sets of models should function as a

global transportation simulator. The global transportation simulation must contain the following components of the transportation network (nodes and links):

a. Nodes. Data on the nodes indicates the capability of the facilities at the node to receive, store and outload the movement requirement that originates or flows through the node. The nodes are subdivided into three areas--CONUS, intertheater, and intratheater.

(1) CONUS Nodes. The CONUS nodes consist of the industrial base, DOD depots, unit locations, and intermediate locations where the movement stops prior to reaching the port. The primary sources for data on the capability of the nodes is from MTMCTEA installation transportation system capability studies and the MTMC CONUS Military Installation Materiel Outloading and Receiving Capability Report.

(a) Industrial Base (factories, producers).

(b) Home Station/Mobilization Station.

(c) Depot/National Inventory Control Point (NICP).

(d) Assembly Area.

(2) Intertheater Nodes. Ports of embarkation (POE) and ports of debarkation (POD) include airports (APOE, APOD) and seaports (SPOE, SPOD) that are used for transshipment of unit equipment, personnel, ammunition, and resupply cargo to the theaters of operation. Major sources of data are the MTMC studies, DIA IOSS, DOD sealift studies, and the Joint Strategic Capability Plan (JSCP) and JOPS Standard Reference Files.

(3) Intratheater Nodes. Data is available from theater OPLANs. These nodes include:

(a) POMCUS Sites.

(b) Prepositioned War Reserve Location.

(c) Army Stocks on Prepositioning Force (NTPF) Ships.

(e) Corps Areas.

(f) First Destination Reporting Points (FDRP).

b. Links. The data required for links is length, capacity, and limiting factors. The length of a link is defined as the physical distance between nodes and is measured in miles/kilometers. The capacity consists of units of weight (short tons per unit of distance) or barrels of oil based on (1) length of link, and (2) transportation mode and size of link. There are sufficient sources for determining distances for all the links in the network and the capacities can be determined.

(1) CONUS Links. Data for CONUS links can be obtained from state agencies, federal government agencies, and the private sector. MTMC is the major DOD source. Carrier associations are the major source in the private sector.

(a) Air.

(b) Highway.

(c) Rail.

(d) Waterway.

(e) Pipeline.

(2) Intertheater Links. The intertheater links are by sea and air. There are various sources for distances between airports and seaports. AFPDA and MTMC Pam 700-1 provided distances specific CONUS SPOEs and likely SPODs. The DIA lines of communication studies provide distances for highway routes, railroad lines, and navigable inland waterways.

(3) Intratheater Links. DIA IOSSs, LOC surveys, and transportation studies are the major sources of data. The AFPDA and MTMCTEA transportation such as the Korean Study also provide data.

(a) Air.

(b) Highway.

(c) Rail.

(d) Waterway.

(e) Pipeline.

The final decision on the selection of additional models for implementation on the system and the conceptual design of any new model will be made by the leader of the technical working group of the Strategic Mobility Division assisted by the US Army Concepts Analysis Agency.

E-5. INFORMATION CONCERNING THE BASE CASE SET OF INPUTS FOR MODELS

a. Each simulation model must have a standard set of reports and outputs for a given situation against which a "what-if" analysis may be compared. For example, for the JPAM European theater of operations for a budget year, a model user may want to determine the impact of changing the table of organization and/or equipment of a unit being moved (in other words, changing the movement requirement in terms of numbers of troops and/or size and amount of equipment due to a TOE change). To do this, there must exist a basis from which to change. (It would be undesirable to need to manually enter a new set of input parameters each time a model is run. Even if the inputs were entered

"from scratch" for each run, there still exist no results for a comparison basis.)

b. The base case set of inputs consists of a set of movement requirements, a set of transportation assets, and a transportation network. The movement requirements and assets are generally from a modified JPAM file, while the network data is taken from the Office of the Secretary of Defense (OSD). The process is intended to be similar to the JPAM process.

c. For the planning years, the JPAM data is adequate. However, for the Program, Budget, and Current years, the JPAM data is out of date due to actual programing and/or budget changes. For the current year, the budget not only has been subject to change, but may not have been executed in the manner foreseen. Therefore, for the current year, the OMNIBUS force tape is used because it reflects current movement requirements for the current force. All these factors result in continual changes to the base case of each model, and must be handled by the system manager. In general, the base case inputs of the models are taken from the different sources for the following years. In the example below (Table E-1), the FYs are shown for work done during FY 87.

Table E-1. Base Inputs

Year for analysis		FY	Years out	Initial inputs from:
The current year	Current force	87	0	OMNIBUS force tape year 0[a]
The budget year	Budget force	88	1	JPAM for year 1[a]
The program year	Program force	89-93	1-5	JPAM for year 1-5[a]

[a]Input data for these years must be modified to reflect actual system capabilities based on programing, budget and execution changes, as they occur.

d. For an action officer to conduct correct analysis on the effects of change in policy for a given year, she/he must use the correct year's base case. The base case of the current year will show current capabilities, while the base case for future years will each show different capabilities (hopefully increased capabilities each year in the future).

E-6. CONCEPT OF MODEL FUNCTIONING. The concept for the initial data inputs for developing a base case report for each model has been explained in previous paragraphs. Here, the linkage between individual models is explained.

a. There is currently no model which adequately addresses CONUS mobilization and movement. Base case inputs are intended to drive this CONUS and mobilization model. The base case input consists of movement requirements, assets, and the transportation network, expressed in terms of a date which particular cargo must be at its CONUS POE, and a date for it to be at its overseas POD. Since the POEs are specified, the CONUS model is run to ensure that the force can, in fact, meet its required POE date and, if not, modify that POE date for input into an intratheater model.

b. Hence, the output of the CONUS model is used to drive the intertheater model. The output of the intertheater leg is used as input to the various port and intratheater models, as shown graphically on Figure E-1. Until an adequate CONUS model becomes available, the base case inputs will be configured to serve as inputs for an intertheater model.

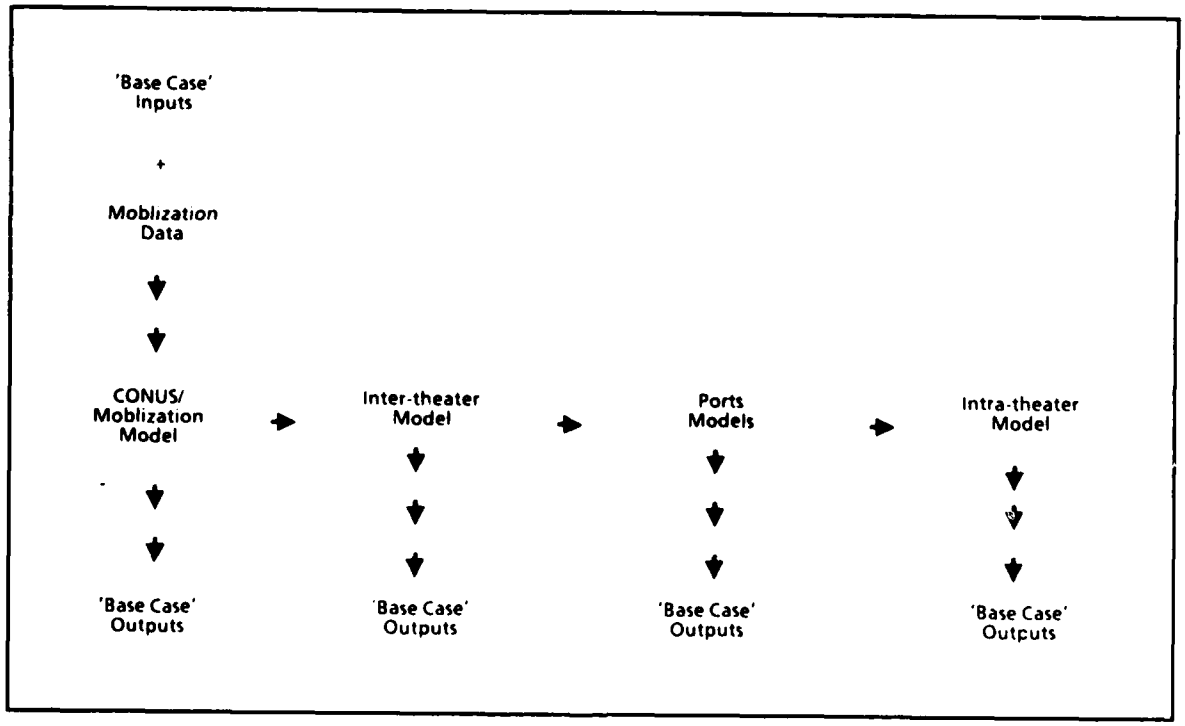

Figure E-1. Concept of Model Functioning

c. One set of base case outputs is maintained for each model for each of the current, programing, and budget years, against which changes can be compared.

d. The base case inputs must be constantly updated to reflect current funding approvals for PDIPs and budget execution, so that the base case outputs also reflect the current situation for each year.

APPENDIX F

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GLOSSARY

1. ABBREVIATIONS, ACRONYMS, AND SHORT TERMS

AD	active duty
ADCSLOG	Assistant Deputy Chief of Staff for Logistics
ADP	automated data processing
ADPE	automated data processing equipment
AFPDA	Army Force Planning Data and Assumptions (study)
AEA	automation economic analysis
AIED	Army Industrial Equipment Data base
AIF	Army Industrial Fund
AIPP	Army Industrial Preparedness Program
ALA	Army Logistics Agency
ALO	authorized level of organization
ALOC	air line(s) of communication
AMC	US Army Materiel Command
AMDF	Army Master Data File
AMOPS	Army Mobilization Operations Planning System
ammo	ammunition
APOD	aerial port of debarkation
APOE	aerial port of embarkation
AO	area of operations; action officer
APEX	Automated Planning and Execution Control System
ARPO	Advanced Research Projects Office (CAA)
AR	Army regulation
ASAPP	Army System for Automation of Preparedness Planning
ASMSA	Army Strategic Mobility System Assessment
ARSTAF	Army Staff

AUEL	automated unit equipment list
AUTODIN	Automated Digital Information Network
bbl	barrel
BOIP	basis of issue plan
BPI	bytes per inch
BSC	binary synchronous communications
CAA	US Army Concepts Analysis Agency
CENTCOM	US Army Central Command
CFAM	Contingency Force Analysis Methodology Model
CINCMAC	Commander in Chief, Military Airlift Command
CINCUSAREUR	Commander in Chief, US Army, Europe
DMS	Conversational Monitor System
CNO	Chief, Naval Operations
COBOL	Common Business Oriented Language
COMPASS	Computerized Movement Planning and Status System
CONUS	continental United States
COR	Contracting Officer's Representative
COSCOM	corps support command
CPU	central processing unit
CRAF	Civil Reserve Air Fleet
CRAS-84	Container Requirement and Availability Study (MTMC)
CRT	cathode ray tube (computer monitor)
CS	combat support; composite service
CSA	Chief of Staff, US Army
CSS	combat service support
DA	Department of the Army

DALO-TSM	Strategic Mobility Division, Deputy Chief of Staff, Logistics
DBMS	Data Base Management System
DCF	Document Composition Facility
D/RM	Directorate for Resource Management
D/TRETS	Directorate for Transportation, Energy and Troop Support
DCSLOG	Deputy Chief of Staff for Logistics
DSCOPS	Deputy Chief of Staff for Operations and Plans
DCSRDA	Deputy Chief of Staff for Research, Development and Acquisition
DDN	Defense Data Network
DFRIF	Defense Freight Rail Interchange Fleet
DG	Defense Guidance
DIA	Defense Intelligence Agency
DINET	Defense Industrial Network
DISCOM	division support command
DISSPLA	Display Integrated Software System and Plotting Language
DLA	Defense Logistics Agency
DM	decisionmaker
DMA	Defense Mapping Agency
DMS	Display Management System
DRIS	Defense Retail Interservice Support
DOD	Department of Defense
DODD	Department of Defense directive(s)
DSS	Decision Support System
EBCDIC	Extended Binary Coded Decimal Interchange Code
ECF	Equipment Characteristics File

EDATE	effective date (MTOE, TDA)
EEA	essential element(s) of analysis
EOH	equipment onhand
ERC	equipment readiness code
FAD	force activity designator
FAS	Force Accounting System
FD	functional description
FDMIS	Force Development Management Information System
FDRP	first destination reporting point
FISO	Force Integration Staff Officer
FM	field manual
FOA	field operating agency
FORFA	Forces File
FORMDEPS	Forces Command Mobilization Deployment Planning System
FORSCOM	US Army Forces Command
FORSTAT	Force Status and Identity Report System
FORTRAN	Formula Translation (Computer Language)
FYDP	Five-Year Defense Program
G&A	general and administration
GDDM	Graphical Data Display Manager
GEOLOC	GEO location file; WWMCCS standard file
GRC	General Research Corporation
GSA	General Services Administration
HNS	host nation support
HQ	headquarters
HQDA	Headquarters, Department of the Army
HS	home station

IBM	International Business Machine computer model
ICU	interactive chart utility
I/O	input/output
IOSS	Integrated Operational Support Studies
IP	implementation procedures
IPR	in-process review
JCL	job control language
JCS	Joint Chiefs of Staff
JDA	Joint Deployment Agency
JOPS	Joint Operation Planning System
JPAM	Joint Program Assessment Memorandum
JSCP	Joint Strategic Capabilities Plan
JSOP	Joint Strategic Operation Plan
JSPD	Joint Strategic Planning Document
JSPDSA	Joint Strategic Planning Document Supporting Analysis
km	kilometer(s)
LAD	latest arrival date
LAMP	Logistics Automation Master Plan
LIN	line item number
LFF	Logistics Factors File
LOC	line(s) of communication (logistic routes)
log	logistics
LOGON ID	LOGON information
LOTS	logistics over the shore operations
LSSG	Logistics Studies Steering Group
m	meter(s)
MACOM	major Army command

MANX	Manpower Annex File
MARC	Materiel Acquisition Resource Committee
MBMS	Model-based Management System
MDEP	Management Decision Package
MENS	Mission Element Need Statement
mgmt	management
MIDAS	Model for Intertheater Deployment by Air and Sea
MIS	management information system
MISS	Management Information System Submodule
mbbls	million barrels
MM	maintenance manual
MOE	measure(s) of effectiveness
MOG	maximum aircraft on ground
MPS	Mathematical Programing System
MS	mobilization station
MSC	Military Sealift Command
MTBSP	FORSCOM Mobilization Troop Basis Stationing Plan
MTMC	Military Traffic Management Command
MTMCTEA	MTMC Transportation Engineering Agency
MTOE	modification table(s) of organization and equipment
MTON	measurement ton
MVS	multiple virtual storage
NAT	nonair-transportable
NATO	North Atlantic Treaty Organization
NDRF	National Defense Reserve Fleet
NEA	Northeast Asia
NICP	National Inventory Control Point

NOTA	Notes File
NSN	national stock number
NTPF	near-term prepositioned force
O&S	operations and support
OCA	Office of the Comptroller of the Army
OCONUS	outside continental United States
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSRDA	Office of the Deputy Chief of Staff for Research, Development and Acquisition
OJCS	Office of the Joint Chiefs of Staff
OM	computer operation manual
OMNIBUS	US Army Operational Readiness Analysis
OPLAN	operation plan
ORSA	Operations Research/Systems Analysis
OSD	Office of the Secretary of Defense
PARR	Program Analysis Resource Review
pax/PAX	passengers
PPC	Program and Budget Committee
PBD	program/budget decision
PBS	Program Budget System
PC	personal computer/microcomputer
PDIP	Program Development Increment Package
PDM	Program Decision Memorandum
PE	program element
PERT	Program Evaluation and Review Technique
POC	point of contact
POD	port of debarkation
POE	port of embarkation

POL	petroleum, oils, and lubricants
POM	Program Objective Memorandum
POMCUS	prepositioning of materiel configured to unit sets
PPBERS	Program Performance Budget Execution Review System
PPBES	Planning, Programing, Budgeting and Execution System
PPBS	Planning, Programing and Budgeting System
PRB	Product Review Board
PROBE	Program, Budget Execution System (Program Optimization and Budget Evaluation)
PROFS	Professional Office System (IBM)
PS	program specification
PSM	professional staff months
PSY	professional staff year
PT	test plan
PWRMR	prepositioned war reserve materiel requirement
PWRMS	prepositioned war reserve materiel stock
PWRS	prepositioned war reserve stock
qty	quantity
RC	Reserve Component
R&D	research and development
RCDB	research, development, and acquisition data base
RD	data requirements document
RDA	research, development, and acquisition
RDACB	research and development consolidated data base
RDAIS	Research, Development and Acquisition Information System
RDAISA	US Army Research, Development, and Acquisition Information Systems Agency

RDD	required delivery date
RDTE	research, development, test, and evaluation
rqmt	requirement
RRF	Ready Reserve Force
RSCS	Remote Spooling Communication System
RT	Test Analysis Report
SA	security assistance
SACS	Structure and Composition System
SAG	Study Advisory Group
SAT	Software Acceptance Test
SDP	System Development Plan
SECDEF	Secretary of Defense
SELCOM	Select Committee
SLOC	sea line(s) of communication (logistic routes)
SMM	Strategic Mobility Module
SMS	Systems Management Submodule
SPOD	seaport of debarkation
SPOE	seaport of embarkation
SQL/DS	Structured Query Language/Data System (data base language and management system)
SRC	standard requirement code
SS	system/subsystem specification
STAIRS	Storage and Information Retrieval System
STON	short ton(s)
STARDAS	Standard Army RDA System
STARNET	Strategic Air Route Network
STRANET	Strategic Highway Corridor Network
STRARNET	Strategic Rail Corridor Network

SWA	Southwest Asia
TAA	Total Army Analysis (study)
TAADS	The Army Authorization Document System
TAEDP	Total Army Equipment Distribution Program
TAP	The Army Plan
TAT	to accompany troops
TB	technical bulletin
TEA	Transportation Engineering Agency
TFE	Transportation Feasibility Estimator
THISA	Transaction History File
TMS	Transportation Models Submodule
TO	transportation officer; theater of operations
TOA	Transportation Operating Agency
TOE	tables(s) of organization and equipment
TPFDD	Time-Phased Force Deployment Data
TPM	technical person-months
TPSN	troop program sequence number
TRADOC	US Army Training and Doctrine Command
trans	transportation
TUCHA	Type Unit Characteristics File; JOPS ADP standard reference file
TWG	Technical Working Group
UIC	unit identification code
UM	user's manual
US	United States
USAF	United States Air Force
USAMSSA	US Army Management Systems Support Agency

USARJ	US Army Japan
UTC	unit type code
VM	virtual machine
VRI	Vector Research, Inc.
WESTCOM	US Army Western Command
WIMS	Worldwide Intratheater Mobility Study
WRMR	war reserve materiel requirement
WRS	war reserve stocks
WWMCCS	Worldwide Military Command and Control System

2. DEFINITIONS

ASSETS	Transportation Assets File; JOPS ADP standard reference file
APORTS	Aerial Ports and Air Operating Bases File; JOPS ADP standard reference file
CHSTR	Characteristics of Transportation Resource File; JOPS ADP standard reference file.
INTELLECT	Software package which allows plain English queries of data files.
INTERMODAL	The transfer of freight vehicles or their load carrying structure (i.e., container) between two or more modes of travel.
Mini-MIDAS	An interactive, intertheater strategic transportation system model developed under OSD contract by General Research Corporation. Microcomputer based. Expected delivery in Feb 78.
MOVER	An interactive requirements model for transportation force structuring developed under Navy contract by Information Spectrum, Inc. Microcomputer based.
PORTS	Ports Characteristics File; JOPS ADP standard reference file.
RAPIDSIM	Rapid Intertheater Deployment Simulation. An intertheater transportation model used by JCS for quick analysis of mobility issues.

SAS	IBM software package for statistical manipulations, programing language.
SHAKER	An interactive, intertheater simulation model currently under development through US Army Transportation School contract by Information Spectrum, Inc. Expected delivery in March 1987.
SITAP	Simulation for Transportation Analysis and Planning. A general purpose transportation model developed by OSD, PA&E, for strategic mobility planning.
stochastic analysis	An analysis of the systems driven by random variables
SUMMITS	Scenario Unrestricted Mobility Model for Intratheater Simulation. An intratheater model which simulates the movement of commodities and personnel between nodes in a theater of operation.
TRANSMO	Transportation Model. An intertheater strategic mobility model in which movement requirements are identified in terms of tonnage by cargo type.

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MARCH, 1988

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